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Committee Would Class Paper As Essential

House Unit Headed by Representative Boren Recommends That Paper Production, Processing Be Recognized as Prime Activity—Declares WPB Should Hold to Horizontal Cuts Only for Paper Industry

The House Subcommittee on Brand Names and Newsprint will recommend that paper processing and manufacturing be classified as essential in order to relieve critical newsprint shortages, the group revealed yesterday. It also believes that the basic manpower problem responsible for the declining output of newsprint could be solved by putting 20,000 additional men, including war prisoners if available, into the forests of the United States for pulpwood cutting activities, and that if a similar program could be adopted simultaneously in Canada the newsprint supply situation would return ultimately to its 1941 level.

This announcement was made by Representative Lyle H. Boren, Democrat of Oklahoma, chairman of the subcommittee, following a series of conferences with representatives of the paper industry in the Waldorf-Astoria Hotel, New York, on August 13.

"If we can't find a solution to the pulpwood production problem," he declared, "there will be a shortage of paper in the newsprint and other phases of the industry that will affect seriously the full war economy of the United States."

Approves Horizontal Cuts Only

"The committee unanimously recommended that the WPB should hold unalterably to horizontal percentage-wise cuts for the industry rather than adopting any form of vertical allocations," Chairman Boren said. "We also feel very strongly that the 100-ton per year base under which smaller publishers are exempted from curtailment should be retained."

The committee also approved generally the principles under which WPB has handled appeals for additional tonnage, and the sliding scale under which the heaviest percentage reductions of paper use have applied to the largest users.

Members of the subcommittee, WPB officials and representatives of the paper industry attended yesterday's luncheon in the Waldorf-Astoria, which was sponsored by the American Paper and Pulp Association. Because of the diverse problems represented, the discussion was divided into three groups, one comprising pulpwood producers, another newsprint manufacturers and a third consisting of representatives of the specialty paper industries.

Would Declare Paper Essential

Representative Boren emphasized that the conference was "an exploratory meeting" at which his committee acquired many facts about the ramifications of the paper industry.

"Up to date, in the field of newsprint and paper, the Government has more or less proceeded on the theory of dividing up shortages," he said. "Our committee feels that probably the emphasis should be on production—doing something positive to abolish the shortage. It is safe to say that the basic problem is one of getting more wood, of putting more wood cutters into the forests."

The committee recommended some time ago, he pointed out, that pulpwood cutting be made an essential occupation in the United States. This was done subsequently, he added, "but a little late and slow." In the meantime, the draft and other industries have drawn manpower away from the forests, he asserted.

Canada, which supplies 75% of the newsprint used in the United States, has not designated pulpwood cutting as an essential industry, Representative Boren explained. In that country, he added, 500,000 persons are normally employed in wood cutting and in the newsprint factories.

Use of War Prisoners Discussed

In reply to a question about the employment of prisoners of war as wood cutters, Mr. Boren declared such workers "unquestionably could be used to some advantage." Experience has shown, he added, that Italian prisoners could be used more easily than German because the latter had attempted sabotage and tried to escape on some occasions.

E. W. Tinker, executive secretary of the American Paper and Pulp Association, stated at the conclusion of the pulpwood session that unless manpower shortages can be relieved the United States faces a reduction of 40% during 1944 in the supply of printing papers of all kinds, compared with 1942. He also stressed the fact that in addition to newsprint there

(Continued on page 22)

Higher Prices May Help Pulpwood Supply

OPA Increase in Ceiling Price in Three States By $1 to $2 a Cord is Expected to Provide Some Relief to Acute Situation—Superintendents Honor George W. Mead—Other Industrial News

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., August 16, 1943—Some relief from the impending shortage of pulpwood in Wisconsin mills is expected to result from the announcement last week by the Office of Price Administration that the ceiling price in Wisconsin, Minnesota and Michigan has been increased $1 to $2 per cord.

This ruling will permit operators to pay loggers the 12½ cents per hour increase, approved July 9 by the War Labor Board. This more attractive figure is expected to stop the migration from the woods to the war plants, and may bring many loggers back to their jobs this fall.

Higher prices also will bring through to greater success the publicity and advertising campaigns now under way in the newspapers to induce farmers and small plot owners to engage in selective logging this fall and winter, moving to the mills whatever stands they have suitable for pulpwood. Some excellent efforts already are being made along this line and are bringing results.

Dealers also are permitted by OPA to take an allowance of $1.00 per cord above the producer price, and a differential of $1.00 per cord for truck-delivered wood over the f.o.b. car price. Those who cannot qualify as dealers under OPA regulations are to be allowed 50 cents per cord above the producer price, with aggregate commissions not to exceed $1.00 per cord.

Appeals are being made to landowners in Bayfield and Douglas Counties of Wisconsin to salvage, even at some sacrifice, the estimated 1,000,000 cords of pulpwood blown down over a 65 square mile area by a recent storm. Although the trees are a tangled mess and the job will not be easy, the patriotic duty is being pointed out by newspaper editorials. This salvage, it is pointed out, would break the jam and keep the mills operating. There is some talk of obtaining federal aid on this project if the logging operators cannot see their way clear to tackle it on their own.

Some mills have a two-year supply of wood on hand, and others are down as low as a two months' run unless they can obtain replenishments. Redistribution from oversupplied mills has been discussed as a possibility, but it is believed the War Production Board will not go to this extreme unless some of the mills actually face a shutdown.

Paper Mill Workers Hold Outings

Hundreds of workers and their families attended the annual picnic of the Neenah, Wis., mills of Kimberly-Clark Corporation at Riverside Park, Neenah, Sunday, August 8. S. F. Shattuck, vice-president, gave the address of the day in which he complimented the Kimberly-Clark Activities Association on the arrangements. The outstanding entertainment was the afternoon and evening performances by the barn dance troupe of radio station WLS, Chicago. Lakeview mill won the baseball championship by defeating the Badger-Globe team 7 to 3. Concession stands sold more than 5,000 bottles of soft drinks.

Gilbert Paper Company employees also held their ninth annual picnic Sunday, August 8, at Smith park, Menasha, Wis., with more than 1,200 attending. A softball game was held in which the mill team defeated the office workers 12 to 11. A total of $200 worth of war stamps was awarded in prizes for various games and contests. The awards were made by George Gilbert, who was the sponsor of the outing.

Mosinee Mills Reelect Officers

Mosinee Paper Mills Company stockholders held their annual meeting August 4 at the company's offices at Mosinee, Wis., and reelected directors and officers. Stockholders were informed that while all kraft paper mills had been curtailed 15 per cent in production, the company had enjoyed a fairly successful year.

Officers reelected are: A. P. Woodson, president; George L. Ruder, vice-president; A. L. Kreutzer, treasurer, and Norman S. Stone, secretary-manager. Additional directors are Howard Dessert, H. M. Thompson and J. D. Mylrea. W. H. Knoedler was reelected assistant secretary-treasurer.

Superintendents Honor George W. Mead

Four machines at the Consolidated Water Power and Paper Company's main mill at Wisconsin Rapids, Wis., and all machines at the Biron, Wis., mill were shut down for four days from August 4 to 9 in order to give all machine workers a bulk vacation. Operations were resumed Monday, August 9.

George W. Mead, president of the company, was presented with an honorary membership in the American Pulp and Paper Mill Superintendents Association at a ceremonial dinner at the Bull's Eye Country Club, Wisconsin Rapids, August 6. The presentation was made by Grover Keeth of the Marathon Paper Mills Company, Rothschild, Wis., retiring president of the association. The dinner was sponsored by Consolidated's members of the association, and was arranged by C. E. Jackson, manager of the Wisconsin Rapids mill.

Major Bellack Reports for Training

Major Richard F. Bellack, who recently left his position as executive vice-president of Fox River Paper Corporation, Appleton, Wis., for service in the army, has reported to Camp Custer, Mich., for five weeks of induction training. From there he expects to go to Charlottesville, S. C., where he will attend the school for personnel of the American Military Government of Occupied Territories.

Paper Sales Up, Inventories Down

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., August 18, 1943—Sales of paper and products were up 17 percent in June over last June, according to a report of the Bureau of Census. Sales gained 6 percent in June over May. Inventories were down 12 percent this June compared with last and 1 percent under May stocks.

THE DYE THAT NEVER SAYS DIE!

OUR MAN'S down all right, but he's not out. He's still got a fighting chance.

For as he hits water, the American pilot rips open his "Life Jacket Dye-Marker"...spreading a brilliant yellow-green splotch around him. From the air, that vivid patch can be seen miles away by day... is even visible in moonlight... signalling searchers to the rescue.

Making sure that our pilots will get this life-saving chance is one of Calco's war jobs. Working in collaboration with the Army and Navy, our Application Laboratories developed the dye-marker using Calco Uranine—also known as the sodium salt of fluorescein. We designed to close specifications the special waterproof kit which holds it. And today, these uranine dye-markers are being used by both Army and Navy pilots.

Over the years, Calco Technical Service has handled requests for special dyestuffs and made studies for practically every industry that uses color. It is proud that the valuable experience gained can be of vital service to the fighting men who will bring us victory.

CALCO CHEMICAL DIVISION · AMERICAN CYANAMID COMPANY

BOUND BROOK, NEW JERSEY

BOSTON PHILADELPHIA PROVIDENCE NEW YORK CHARLOTTE CHICAGO

Labor Shortage Acute in Canadian Woods

Fuel and Newsprint Supply Situations Declared Most Serious For Lack of Manpower—More Than 6,000 More Men Now Required —Lack of Proper Government Planning Cited as Basic Cause

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., August 16, 1943—Considerable anxiety is being expressed here over an acute shortage of labor in the forest industries, with particular application to the fuel and newsprint situation. In regard tc the former, Francois Faure, president of the Quebec Forest Industries Association, has given out a statement in which he says:

At Least 6,000 More Men Needed

"We have been obliged to tell the Canadian Government this: 'You have told us how critical is the fuel wood situation in Canada. We have promised to help. Farm activity has reached its peak period and the time for getting sufficient farmers into the woods for fuel wood cutting this year is past. Therefore, if you want us to make good on our promise to help keep the people warm by delivering 150,000 cords of fuel wood, you must provide 6,000 men for cutting. Whether they come from the armed forces or from elsewhere, we must have them at once. Fuel wood is useless unless it will burn. Fuel wood gotten out after October 15 will not season in time to burn this coming winter. That means you have just fifty days—no more—to help us produce the 150,000 cords we have promised from Quebec woods. To produce that volume will require 300,000 man days, or 6,000 men for fifty days remaining. If there are further delays, and only forty working days remain, then we must have 7,500 men. Again, we are still willing, anxious to help; but we cannot produce if you do not supply us the manpower'."

Criticizes Government's Manpower Policy

This represents the views of Quebec pulp and paper companies, who are vitally interested in the supply of wood for fuel. In respect to the newsprint situation, open criticism of the Government's manpower policy is expressed by the Montreal Gazette. Referring to the meetings in Washington of the special sub-committee of the House of Representatives to probe into newsprint output and supply and its plans to visit newsprint production areas centred on Montreal and Ottawa, the Gazette says:

Lack of Essential Rating a Factor

"It may reasonably be inferred that the committee's plan to visit Canada reflects its inability to judge the situation intelligently on the basis of the terse, guarded official statements that have been issued, in regard to the $8-per-ton increase in paper prices and the curtailment of deliveries to U.S. publishers. The proceedings of the committee to date show that the feeling persists in American circles that the hobbling of production, curtailment of deliveries and the officially permitted price advance, all stem from lack of an effective policy in Canada to ensure woods labor for cutting logs for pulping.

"In the U.S. drastic drainage of woods labor into war services was braked down, almost too late, by giving such workers exemption from the military draft as essential labor. In Canada, the cutting of wood this year (on which next year's paper production depends) has been seriously crippled because the Government has failed to give woods labor any rating as essential and has repeatedly stalled on the proposal to grant military service deferments.

"The muddle should be promptly and decisively cleared up, and both Canadian and American publishers satisfied that all possible is being done to enable them to carry on their important wartime function of disseminating news. There should be full ventilation of the facts of the situation, and necessary steps taken to maintain the industry's resources of labor in the woods—the primary source of paper production."

Want Newsprint Making Made "Essential"

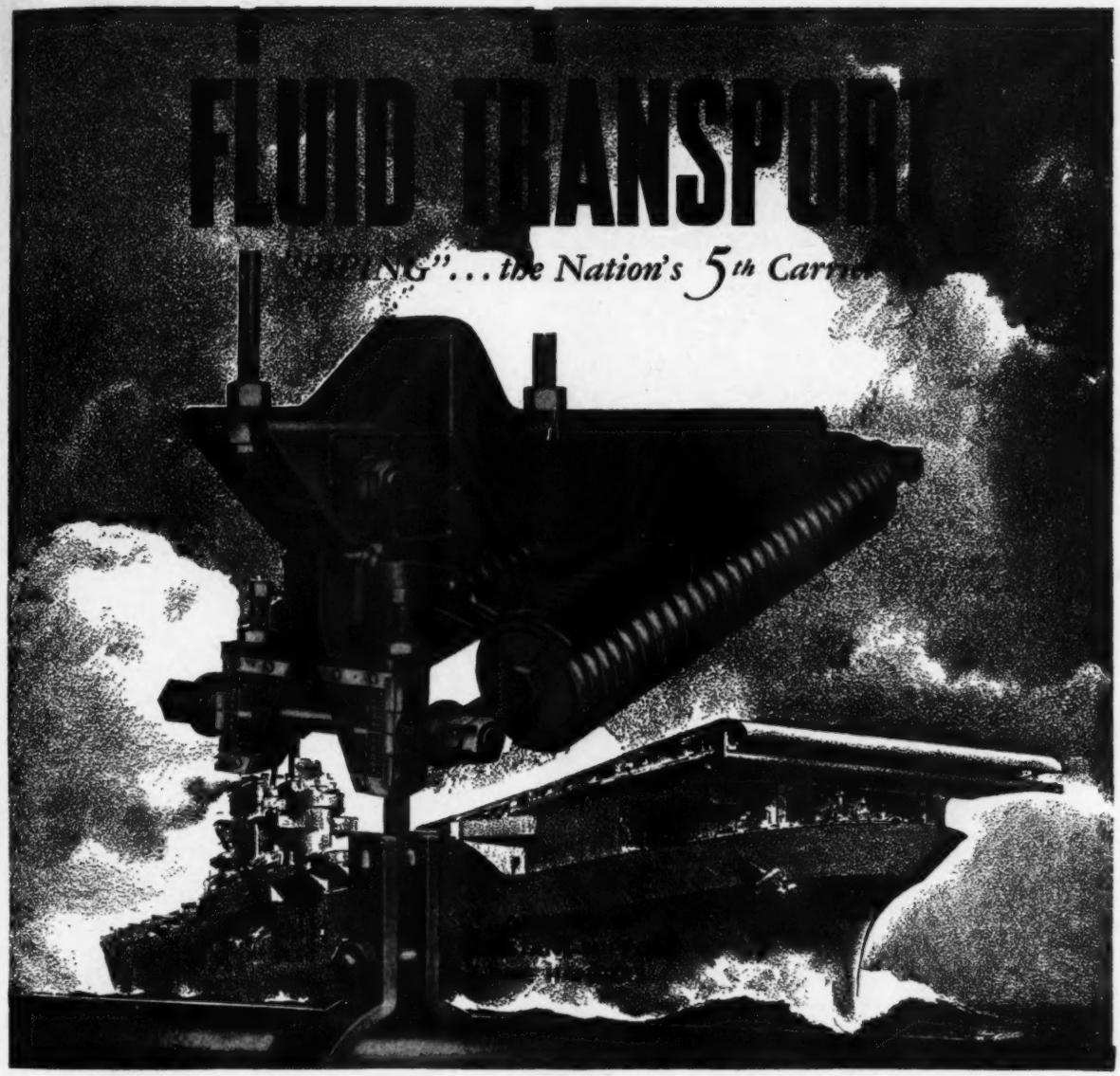
Members of a sub-committee of the House of Representatives in Washington arrived in Montreal on Saturday for an inspection tour of the newsprint mills in Quebec province. The committee was headed by Tyle H. Boren, of Oklahoma, who in a lengthy interview, was asked what the committe might do after their finding here and in the United States. He replied: "What we may do in Congress can best be represented by, first, the fact that our recommendation that the newsprint industry be declared an essential industry, thus conserving manpower, was adopted; and, second, that our recommendation that the allocation of newsprint paper production be kept on a horizontal rather than a vertical basis was also adopted."

Asked to explain what was meant by "a horizontal rather than a vertical basis," he said: "We mean that when there is a decrease in quotas, as in the 10 per cent. cut already in effect, that it be the same for everybody. For instance, when a 10 per cent. cut is warranted each quota user should be cut 10 per cent. It should not be judged according to their wants thus avoiding any disturbances."

Mr. Boren declared his belief that the problem of shortages could be solved immediately if the United States and Canada each placed 20,000 additional men in the forests for pulpwood cutting.

The invitation to this committee to visit the Quebec mills was originally extended by the Canadian Department of External Affairs and the Wartime Information Board. The tour is being conducted under the auspices of the Newsprint Administration of the Wartime Prices and Trade Board and the Canadian newsprint industry.

Before coming here the committee conferred with paper manufacturers in New York. It was announced that trips to Minnesota and Texas, originally planned to follow the tour in Quebec, would be eliminated, but that the committee would investigate the Pacific northwest pulpwood and lumber regions in the United States and Canada.



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Grinnell is meeting these and similar extreme demands for specially engineered piping systems both afloat and ashore. Grinnell plants offer the most modern facilities for fabricating the connecting links which convert a pile of pipe into a complete piping system for efficient FLUID TRANSPORT.

For new war construction and maintenance and repair of existing piping, call Grinnell Company, Inc., Executive Offices, Providence, Rhode Island. Plants and offices throughout the United States and Canada.

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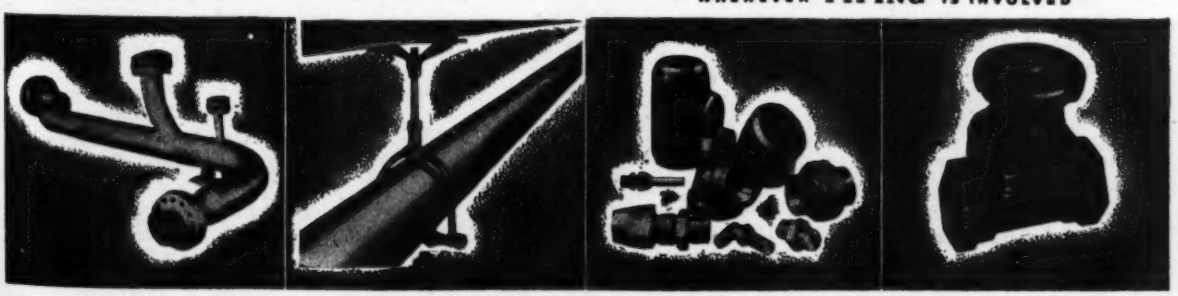
WHENEVER **PIPING** IS INVOLVED



Paper Orders in Midwest Still Mounting

All Types and Grades Are Reported In Relatively Tight Supply With Backlogs Steadily Increasing—Protest Freight Rate Changes —Salesmen Plan August Program and Include Golf Outing

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., August 16, 1943—The Chicago paper market gave indications this week that it preferred knowing where it was going, no matter how mysterious the destination, than to face continued uncertainties. The feeling is reported to be growing here that the pulp allocation program is producing some good results and that while there will not be much pulp left after lend-lease and war needs, there will be actual knowledge of what to plan on. The gravity of the wood situation, brought about by shortage of manpower during the wood cutting season, is giving the industry its greatest worry.

Specifically, there was little to report locally except the continued effort on the part of the jobber and sales representatives staffs to make "something out of nothing" or orders out of frantic requests for paper. Virtually all the grades which have, in the past, been referred to as "step sisters" have now pulled up into the vanguard of peak performers and the tightening up situation has sent backlogs spinning ahead until well after the first of the year as far as orders are concerned. Krafts, ground woods, specialties, books and covers, newsprint and board markets are all finding it increasingly difficult to fill orders while the waste paper market shows increasing need for well organized conservation programs, according to local reports.

Protest Freight Rate Changes

A strong protest against any changes in the freight rate structure which would threaten middle western industry and reportedly favor competitors in other parts of the country was filed this week by the Chicago Association of Commerce. The brief, filed with the Interstate Commerce Commission, on behalf of midwest shippers, opposed general downward revision of all class freight rates on manufactured goods moving in the regions south of the Ohio and Potomac rivers and east of the Mississippi, unless at the same time an upward revision of commodity rates on raw materials carried in the same area is effected. To do the first and not the second, the Association pointed out, is tantamount to subsidies for the southern industry. The Association contends that rates should be continued unchanged in the five Middle Western States of Illinois, Indiana, Ohio, Michigan and Wisconsin even though rates in other sections were reduced, provided that "accepted transportation principles be recognized in such downward revisions." Representatives of the State of Ohio have already appeared before the Commission with a similar presentation protesting the changes.

Hepburn Takes Over Tomahawk Sales Office

A. G. Hepburn, formerly with the Tomahawk, Wisconsin, mills of the Tomahawk Kraft Paper Company, is now preparing to take over the Chicago and territorial sales work formerly carried on by Ray George who resigned on July 15 to go into another line of business. Mr. Hepburn has been advertising manager of the Company and comes into the Conway Building offices with an excellent understanding of the products of the company.

Salesmen Plan August Program

The western division of the Salesmen's Association of the Paper Industry spent Monday noon, August 9, discussing the business outlook in general and in formulating plans for two special events which will wind up a successful summer season which has, incidentally, proven the helpfulness of keeping the group closely together during the vacation period. The final golf outing, unless plans are perfected for some added attraction during the TAPPI sessions in September, is slated for Friday, August 20, at the long and hard Bob-O-Link Golf Club on Chicago's far North side. Golf chairman Herman Berge of Appleton expects a good turnout inasmuch as most vacation goers will be back home by that time according to advance information.

The second of the series of "specials" is to be held on Monday noon, August 23, at the Hotel Sherman as a feature of the occasional speaking program which the salesmen have adopted. Dr. M. M. Rosten of the Ontario Paper Company mills at Thorold, Ontario, will be present on that date to describe how that subsidiary of the Chicago Tribune produces ethyl alcohol out of sulphite waste liquor and builds it into critically needed synthetic rubber. The meeting has aroused a great deal of interest and the Association expects a record breaking number of guests for the noon session on the 23rd.

Powell River Conserves Fuel Gas

[FROM OUR REGULAR CORRESPONDENT]

VANCOUVER, B. C., August 16, 1943—As an emergency wartime measure to conserve fuel oil the Powell River Company is installing a second-hand electric boiler in their steam plant at Powell River.

Due to the B. C. wartime regulations in the production of newsprint the plant is at present operating on a curtailed production program. One of the effects of this curtailment is that the electric power load required by the mill is considerably decreased, with the result that the Company's hydro-electric development, both at Stillwater and Powell River, is not being utilized to its full capacity, and water is being wasted over the spillways of the dams.

This surplus power will be used to displace fuel oil for the generation of steam as soon as the new boiler is put into service, which is expected to be around the middle of this month.

In the installation of the boiler the use of vital materials has been kept to an absolute minimum. The boiler being installed was purchased secondhand from Kenogami, Quebec, where it had been in service for a great many years. A large amount of other equipment necessary for the boiler installation was also purchased secondhand or salvaged from materials on hand at Powell River.

How to conquer wood-destroying fungi

To fungi and bacteria, your lap and pulp stock supply is a source of food and nourishment. It furnishes an excellent feast—especially when aided by moisture and temperature conditions.

You can defeat this combination of destructive agents with Dowicides. These industrial germicides and fungicides pre-

vent mold growth in lap and pulp stock. Treatment is made by applying solutions of Dowicides; tests show that proper applications even control mold throughout the layers of stock.

During shut-down periods, souring of stock caused by bacterial action can also be prevented by the addition of Dowicides. This and other uses of Dowicide products are described in special literature available on request.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York • St. Louis • Chicago • Houston • San Francisco • Los Angeles • Seattle

OTHER PROTECTIVE SERVICES—For the protection of pulp logs in storage, Dowicide G or P. For longer felt life—Dowicide G. For the preparation of mold-resistant paper products—Dowicide A, B and G. For the prevention of decay and termite attack—Dowicide G. For controlling slime conditions—various combinations of Dowicide with other materials. For reducing maintenance costs—Dowicide 7, preserves structural timbers; Dowicide 6, protects paint film from mold growths.

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CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

Reviews Wood Pulp Situation

Near-stability appears to have been achieved in the amount of new wood pulp becoming available for consumption in the United States, Fred G. Stevenot, president, Puget Sound Pulp and Timber Company, states, but at a level considerably below the current rate of consumption. He warned that the national pulp stock pile is being depleted at a rate which cannot be long continued.

Total pulp production of 4,557,000 tons in the first half of 1943 came within 116,000 tons of equaling production in the last half of 1942, but fell 965,00 tons short of the record for the first half of that year, Mr. Stevenot said. Domestic production, augmented by slightly increased imports and a reduction in exports, provided approximately the same total amount of new supply for domestic consumption in each of the four quarterly periods ended June 30, 1943.

Some divergence in trends was pointed out by Mr. Stevenot, with slight gains in receipts of mechanical pulp, from which newsprint is made, while chemical pulp receipts showed minor declines in successive quarterly periods.

"For most of the past year pulp inventories have been drawn upon heavily to meet consumption demands," Mr. Stevenot declared. "Stocks at pulp producing mills were reduced 47%, from 192,000 tons in August, 1942, to 102,000 tons in June, 1943. Stocks of paper grades of pulp declined an estimated 37% between October, 1942, and June, 1943."

Crux of the situation is the low rate of production of logs and pulpwood for months past. Sharp inroads have been made in inventories of wood for pulping purposes, but even this expedient enabled pulp mills to operate at only about 78% of capacity in th first half of 1943, and at less than 75% of capacity in June.

"Renewed efforts, all on a voluntary basis, are now being made to step up production of logs and pulpwood," Mr. Stevenot said. "It is vital to the nation's welfare that these efforts succeed."

Inspect Espanola Mill

KALAMAZOO, Mich., August 16, 1943—A three-day inspection tour of Kalamazoo Vegetable Parchment Company properties at Espanola, Ont., with the view of going ahead with plans for development of a modern pulp mill there, was completed this week by a party of KVP officials and Americans and Canadian bankers.

President Ralph A. Hayward headed the group and reported that members of the party were favorably impressed by potential possibilities of the KVP's Canadian holdings which were acquired last January.

After inspecting all buildings and equipment members of the party visited the wood's limits which will supply pulp for the proposed new mill.

In the party from Kalamazoo were members of the KVP board of directors including Charles S. Campbell, president of the First National Bank and Trust Company, A. B. Connable, Sr., A. B. Connable, Jr., Austin Reed, Charles J. Monroe, Frank Mosstellar, Harold DeWeerd, Joseph Kindleberger, and Dr. Leslie Dewitt.

Hugo Scheuermann, vice president of the Case National bank of New York, H. T. O'Neil, manager of the Toronto branch of the Royal Bank of Canada, Sen. William H. McGuire, Toronto, KVP solicitor in Canada, and A. J. Walker, general traffic manager of the Canadian Pacific railroad, also attended the inspection tour.

The KVP Canadian properties situated along the banks of the Spanish river include an entire company-owned community, including approximately 250 dwellings in Espanola, business section buildings including stores and shops, a 65-room hotel and a completely equipped 18-bed hospital. A paper mill and a hydro-electric plant furnishing power for a radius of 25 miles of Espanola are also included in the properties formerly operated by the Abitibi Power and Paper Company.

Mills Sponsor Waste Paper Drive

Eastern paper board mills are now sponsoring a Waste Paper Conservation Drive in connection with the Salvage Division of the War Production Board, it was announced by Norman F. Greenway of Robert Gair, Inc., chairman of the eastern committee of the Waste Paper Consuming Industries.

Twelve eastern cities thus far have been designated as waste paper concentration areas, according to Mr. Greenway. These cities include New York, Philadelphia, Baltimore, Rochester, Albany, Providence, Boston, Richmond, Charlotte, Atlanta, Buffalo, Hartford.

Newspaper and outdoor advertising will be used in these areas, featuring a campaign telephone number, which will be a clearing house for information and arranging pickups of the public's waste paper accumulations.

Mr. Greenway pointed out that the waste paper shortage is more critical in these areas than at any time since the war began. Waste paper and pulpwood are the chief raw materials from which containers are made. Millions of containers are being sent overseas every week to supply our fighting forces and Allies with food, medical supplies, clothing, and many weapons of war. The containers sent overseas cannot be returned for re-use. This has been a progressively serious factor in the waste paper shortage, Mr. Greenway declared.

The campaign is being handled by the Olian Advertising Company, agency that handled the first Waste Paper Conservation Campaign which ended in May of 1942.

Boston Paper Men Join Army

BOSTON, Mass., August 15, 1943—Richard Piper, vice-president of Baird & Bartlett Company, box board dealers, has received a commission as Second Lieutenant in the Massachusetts State Guard.

Charles F. Small, who has been with Storrs & Bement Company as city salesman for several years, has been inducted into the Army. He has competed with rifle marksmanship teams in this country and in England and has won many cups.

OPA Sets Newsprint Price at $59 a Ton

WASHINGTON, August 14, 1943—The Office of Price Administration issued formal orders today permitting an increase of $4 a ton in the manufacturers' price of newsprint. The change, whch is effective September 1, raising the base price of standard newsprint to $59 a ton, was jointly announced by the OPA and the Canadian Wartime Prices and Trade Board on July 22. The usual zone differentials will rule in the several geographic regions.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending August 14, 1943

STOCKS	High	Low	Last
A. P. W.	2⅛	2⅛	2⅛
Armstrong Cork Co.	34¾	33⅞	34½
Celotex Corp.	13¾	12⅞	13¼
Celotex Corp., pf.	18⅞	18¾	18⅞
Certain-Teed Products Corp.	6¼	5⅞	5⅞
Certain-Teed Products Corp., pf.	56¾	55	55½
Champion Paper & Fibre Co.			
Champion Paper & Fibre Co., pf.	107½	107	107½
Congoleum Nairn Co.	22¾	22½	22⅝
Container Corp. of America	20¾	19¾	20⅛
Continental-Diamond Fibre Co.	12½	11½	12½
Crown Zellerbach Co.	15½	14⅞	15⅛
Crown Zellerbach Co., pf.	98⅞	98	98¾
Dixie Cup Co.			
Dixie Cup Co.,—A	43¾	42½	43⅜
Flintkote Co.	19¾	19	19½
Flintkote Co., pf.	106½	106¼	106¼
Robert Gair	3	2⅞	2⅞
Robert Gair, pf.	12¾	12½	12½
International Paper Co.	11⅛	10⅝	10⅞
International Paper Co., pf.	59	57½	57½
Johns-Manville Corp.	85	83	85
Johns-Manville Corp., pf.	134½	133½	134
Kimberly-Clark Corp.			
Mac Andrews & Forbes	26⅛	25¼	25¼
Mac Andrews & Forbes, pf.	138	138	138
Masonite Corp.	38¼	38	38
Mead Corp.	8¼	7⅞	8¼
Mead Corp., pf. A-6%	80	80	80
Mead Corp., pf. B-5½%	76⅞	74	76
Paraffine Companies, Inc.	43	43	43
Paraffine Companies, Inc., pf.	101	100	100
Rayonier, Inc.	15	13⅞	14
Rayonier, Inc., pf.	30½	30	30½
Ruberoid Co.	25½	24⅞	25½
Scott Paper Co.	41¾	41½	41¾
Scott Paper Co., pf.	113½	113½	113½
Sutherland Paper Co.	31	29	29
Union Bag & Paper Corp.	9⅞	9⅜	9½
United Paperboard Co.	4½	4⅜	4½
U. S. Gypsum Co.	69¼	67½	69¼
U. S. Gypsum Co., pf.	178	178	178
West Virginia Pulp & Paper Co.	14½	13⅝	14½
West Virginia Pulp & Paper Co., pf.	107½	107¼	107¼

BONDS

Abitibi Pulp & Paper Co. 5s '53	67	66	66
Celotex Corp. 4½s '47			
Certain-Teed Products Corp. 5½s '48	102	101	101⅜
Champion Paper & Fibre Co. 4¾s '50			
International Paper Co. 6s '55	107⅝	107¼	107¼
International Paper Co. 5s '47	105¼	105	105
Mead Corp. 3½s '53			
West Virginia Pulp & Paper Co. 3s '54			

New York Curb Exchange

High, Low and Last for Week Ending August 14, 1943

STOCKS	High	Low	Last
American Box Board Co.	7⅜	7⅜	7⅜
Brown Co., pf.			
Great Northern Paper Co.	33¾	33	33¾
Hummel-Ross Fibre Corp.	4½	4½	4½
National Container Corp.	13⅜	13⅜	13⅜
St. Regis Paper Co.	3½	3¾	3⅜
St. Regis Paper Co., pf.	135	133	135
Taggart Corp.	4	3¾	4

BONDS

American Writing Paper Corp. 6s '61	94	94	94

Scott Co. Bonus Request Granted

WASHINGTON, D. C., August 11, 1943—A request by the Scott Paper Company of Chester, Pennsylvania, to grant a bonus equalling three hours average hourly wages to all employees with perfect weekly attendance was approved unanimously by the National War Labor Board today. The Board approved the bonus to compensate these workers for a loss in weekly earnings resulting from the operation of Executive Order 9240, which prohibits double time for Sunday work as such.

The Board held that since the company had paid premium pay for Sunday work since 1936, and since the regularly scheduled work week includes regularly spaced Sunday work, the double time formerly paid should be considered as an integral part of the employees' wage.

The company employs approximately 1,100 workers. There is no recognized collective bargaining agent for these workers.

The Board's order provides, at the company's request, that only employees with perfect attendance for the week shall receive the compensatory bonus.

The company stated in its request to the Board that the effect of the bonus would be to increase the total hourly payroll by less than 1%.

Central Paper Votes Dividend

A dividend of 15 cents a share of common stock of the Central Paper Company for the quarter of the current fiscal year ended September 30 was declared by the board of directors, it was announced by C. F. Spindler, secretary-treasurer.

Payment will be made on October 1 to stockholders of record on September 20.

The board also resolved that hereafter dividend dates for payments on common stock, if declared, will be made on the first days of January, April, July and October.

Continental-Diamond Earns Less

The Continental-Diamond Fiber Company and wholly-owned domestic subsidiary reports for six months, net income, after $1,170,000 provision for Federal taxes on income, was $426,956 and after $170,000 provision for contingencies, balance of net income was $256,957. Net income for 1942 period, after $620,000 taxes, was $293,588 and balance of net income, after $50,000 provision for contingencies, was $243,588.

U. S. Gypsum Nets $1.98

The United States Gypsum Company and subsidiaries report for the six months ended June 30, 1943, net income of $2,645,825 after all charges including provision for Federal income and excess profits taxes, equivalent to $1.98 a common share. This compares with a revised net income of $2,674,460, or $2.01 a common share for the six months ended June 30, 1942.

Gaylord Declares Dividend

Gaylord Container Corporation directors voted an extra dividend of 12½ cents and the regular quarterly of 12½ cents on the common, both payable September 15, to holders of record August 31. A similar extra was paid in previous quarters.

Great Northern Profits Up

The Great Northern Paper Company and wholly owned subsidiaries for the six months, reports net profit, after $432,505 Federal taxes, was $650,793, or 65 cents a share, against $848,214, or 85 cents a share, after $692,280 taxes, last year.

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When you are doing repair or replacement work on plant piping you can be sure of a good, fast, economical job by using ARMCO Spiral Welded Pipe.

Every foot of "Spiral Welded" is prefabricated to fit your layout. This means that even the most intricate assemblies slip into place quickly and accurately. Fewer flanges and fewer joints are the rule because fittings come welded to straight pipe runs. And ARMCO Pipe is smooth inside for high flow capacity—easy to keep clean too. The fewer joints reduce the possibility of leakage.

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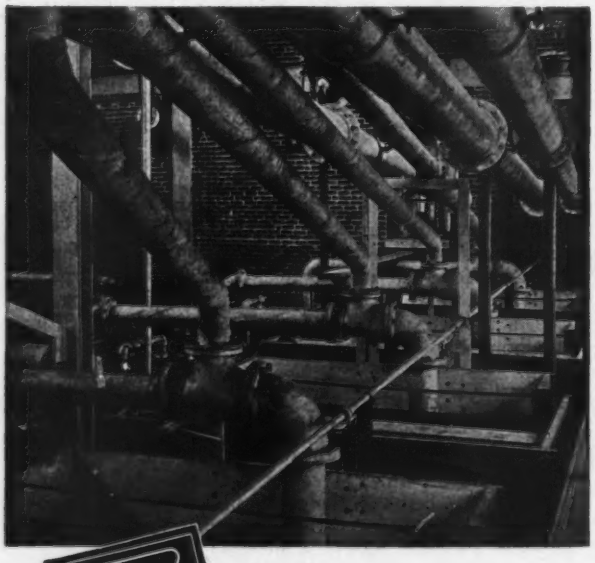

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SPIRAL WELDED PIPE

WOULD CLASS PAPER ESSENTIAL

(Continued from page 9)

are four basic uses of paper in the fields of communication, education, business purposes and packaging, and sanitation.

On the subject of using war prisoners for pulpwood cutting, Mr. Tinker asserted that "a lot of companies in the industry have made plans to use them."

In stating the purpose of the hearings at the outset of the press conference, Representative Boren said the subcommittee "was seeking to obtain from publishers of newspapers, magazines and books, as well as from the pulpwood industry, a background of facts upon which to begin our study in seeking a solution to the problems relating to the paper shortage and its effect on publications in this country."

At the opening meeting of the committee with newspaper publishers, held on August 12, at the Hotel Biltmore, Representative Wolverton declared, a further decrease of one-third in newsprint production from the basic level which prevailed just prior to and immediately following Pearl Haorber is likely, unless there is an increase in pulpwood production.

The recommendation of the WPB that use of paper by Government bureaus be reduced 40%, he added, has not yet been put into the form of a directive, and he indicated that the subcommittee is watching the results of this particular campaign. "The Government," he continued, "should be just as careful in newsprint conservation as it expects the newspapers and magaines to be."

At this point Representative Boren noted that many Government publications have been suspended for the duration and that there has been "a rather widespread conservation of paper by elimination of many forms and duplicating questionnaires. There have been great strides in that direction."

Variation for Linerboard

WASHINGTON, D. C., August 18, 1943—Manufacturers are permitted a maximum variation of 5% in the basic weights for the respective thicknesses of Fourdrinier Kraft linerboards specifically listed in Revised Price Schedule No. 32, the OPA has announced.

The net effect of this action wil be to secure an additional number of square feet of material from every ton produced, without causing a deterioration in quality, since Mullen Test standards that have been in existence in the industry are now incorporated in the schedule.

Today's action, taken to help relieve the shortage in supplies of this material, has received the approval of representative producers and consumers, OPA said. These liner boards are used primarily for the manufacture of corrugated and solid fiber shipping containers.

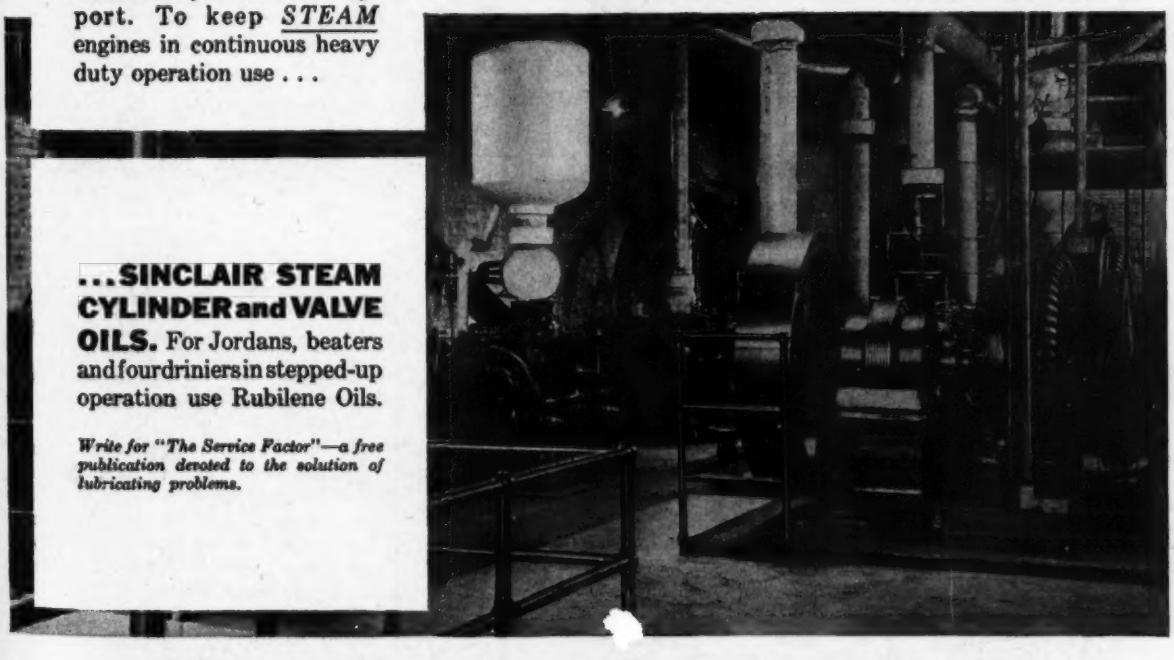
The changes are contained in Amendment No. 6 to Revised Price Schedule No. 32 (Paperboard Sold East of the Rocky Mountains) effective August 18, 1943.

Container Firm Expands

The Container Company of Van Wert, Ohio, a division of Continental Can Company, Inc., will put into use in September a building at Reading, Pa., recently purchased from Reading Iron Company, it was announced today.

Official U. S. Navy Photograph

OVERSEAS ATTACK demands powerhouse support. To keep *STEAM* engines in continuous heavy duty operation use . . .



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The Wayside Inn still stands as a symbol of hospitality to the dusty traveler. Here the coach horses were changed and the post was forwarded. The atmosphere was club-like and cheery. The open fire danced upon the hearth. The candles spluttered on the table, around which the guests gathered for a game of cards, while mine host and his wife were "a bustle" to serve a fine meal. It is still the proud boast of many a New England Inn that "Washington slept here."

When gasoline flows freely once more, and "the American way of life" has been tranquilly restored, we trust our friends will re-visit the old "Bay State," and "stop along by" to see how we make the good **DRAPER FELTS.**

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E. R. LELOFF, Vancouver, Wash.

Newsprint for July

Production of newsprint in Canada during July, 1943, amounted to 262,323 tons and shipments to 284,216 tons, according to the News Print Service Bureau. Production in the United States was 67,883 tons and shipments 68,083 tons, making a total United States and Canadian news print production of 330,206 tons and shipments of 352,299 tons. During July, 24,752 tons of newsprint were made in Newfoundland, so that the North American production for the month amounted to 354,958 tons. Total production in July, 1942, was 338,236 tons.

The Canadian mills produced 193,359 tons less in the first seven months of 1943 than in the first seven months of 1942, which was a decrease of ten and two tenths percent. The output in the United States was 80,460 tons or fourteen and three tenths percent less than in the first seven months of 1942, in Newfoundland production was 57,527 tons or thirty-two and eight tenths percent less, making a total decrease of 331,346 tons, or twelve and six tenths per cent less than in the first seven months of 1942.

Stocks of news print at the end of July were 57,336 tons at Canadian mills and 10,778 tons at United States mills, making a combined total of 68,114 tons compared with 90,207 tons on June 30, 1943, and 174,266 tons at the end of July, 1942.

Indianapolis Uneasy

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., August 16, 1943—With newsprint prices advancing and demand for all grades of paper heavy as compared with the supplies, paper executives in this area are becoming more and more uneasy concerning the future of the market. They fear there is apt to be a lot more of government regulations.

Demand for books, ledgers and covers continued heavy last week in the fine paper field. In spite of the fact that many manufacturers and large wholesale houses have little to make or sell, there is quite a bit of direct by mail advertising going out. Not the volume of former years but more than might be expected in view of current conditions.

Demand for paper specialties continued to increase last week. The laundry situation here has improved somewhat, but delays and losses are frequent and the general public is switching wherever possible to paper towels, napkins and other items.

U. S. Paper Awards

[FROM OUR REGULAR CORRESPONDENT]

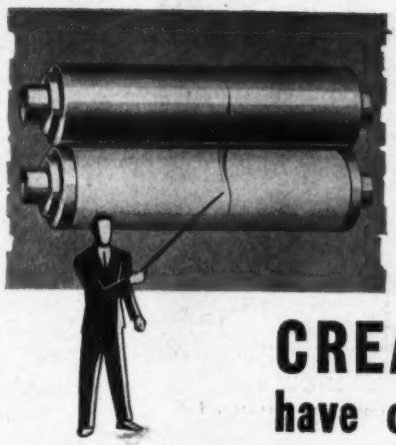
WASHINGTON, D. C., August 18, 1943—The Marquette Paper Company has been awarded the contract for furnishing the Government Printing Office with 199,000 pounds of white ground wood writing paper at .06 cents. Other paper awards made recently at the Printing Office include the following:

Walker Goulard Plehn Company will furnish 60,600 pounds of 50% rag, white manifold paper at 18 cents and the Franklin Research Company will furnish 4,989 pounds of 100% rag, white litho finish chart paper at 25.44 cents. Central Ohio Paper company will furnish 2,795 pounds of 100% rag, white litho finish chart paper at 21 cents and Bermingham & Prosser Company will furnish 4,470 pounds of 100% rag, white litho finish chart paper at 25.32 cents. Same firm will also furnish 5,170 pounds of same at 25.4 cents and the Stanford Paper Company will furnish 95,875 pounds of same at 25 cents and Paper Corp. of U. S. will furnish 158,175 pounds of same at 21.56 cents.

R. P. Andrews Paper Company will furnish 20,000 pounds of oiled manila paper at 9.75 cents and Walker Goulard Plehn Company will furnish 14,854 pounds of buff chemical wood writing paper at 9.25 cents. North American Pulp and Paper Company will furnish 19,100 pounds of buff chemical index buff paper at 10 cents and R. P. Andrews Paper Company will furnish 1,000 sheets of white dura glo cover stock at .175 cents per sheet.

Whitaker Paper Company will furnish 40,000 pounds of white chemical wood mimeograph paper at 8.05 cents and Barton, Duer & Koch Paper Company will furnish 50,960 pounds of white standard offset paper at 9.5 cents. The same firm will also furnish 240,000 pounds of white ground wood mimeograph paper at 5.7 cents and the Stanford Paper Company will furnish 65,000 sheets of mounting board news at $53.00 per ton.

R. P. Andrews Paper Company will furnish 366,000 pounds of sulphite tan bristol cover paper at 8.9 cents and the same firm will also furnish 47,250 pounds of white offset book paper at 7.56 cents. Mead Sales Company will furnish 90,375 pounds of white offset book paper at 7.57 cents and Allied Paper Mills will furnish 120,500 pounds of same at 7.8 cents. Stanford Paper Company will furnish 200,000 pounds of white machine finish book paper at 7.3 cents and Marquette Paper Company will furnish 202,240 pounds of ground wood white writing paper at 6 cents. Wilcox, Walter, Furlong Paper Company will furnish 1,000,000 pounds of chemical wood manila paper at 5.31 cents and the Marquette Paper Company will furnish 800,000 pounds of ground wood writing paper at 6.5 cents. Barton, Duer & Koch Paper Company will furnish 644,800 sheets of 50% rag, green index paper at 14 cents and R. P. Andrews Paper Company will furnish 130,400 pounds of bristol uncoated paper at 9.15 cents. Marquette Paper Company will also furnish 600,000 pounds of white supercalendered book paper at 7.05 cents and Central Ohio Paper Company will furnish 61,950 pounds of white offset book paper at 7.12 cents. Bulkley, Dunton Paper Company will furnish 50,000 pounds of chemical wood yellow writing paper at $10.05 per cwt. and same firm will furnish 50,000 pounds same pink at same price. Northwest Paper Company will furnish 141,750 pounds of white offset book paper at 7.57 cents.



What effect does CREASED PAPER have on Calender Rolls?

Answer: "When paper which is creased passes between the rolls, they are subjected to extremely heavy pressure on a small area, because the weight of all the rolls above the crease, plus the loading, if any, is applied at the point of the crease. Since a crease usually forms a line contact, the pressure is tremendous, and it can be readily understood why these hard rolls mark."

The above is quoted from page 14 of the *new* 32-page booklet, "A PRACTICAL GUIDE TO CARE OF CALENDERS AND CALENDER ROLLS." This is just one of the many causes of calender failure discussed. Also describes commonsense precautions and accepted cures . . . gives many helpful hints on roll grinding . . . outlines proper lubrication procedures. *Information applies to any make of calender.* Contains no advertising.

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PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

Henry J. Berger

EDITOR

Vol. 117 August 19, 1943 No. 8

COMING EVENTS IN PAPER INDUSTRY

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Fall Meeting, Palmer House, Chicago, September 21-24, 1943.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

PLACE OF BUSINESS

The unknown is feared and too often is made more formidable by speculation on the uncertainties with which it is associated. Post-war problems frequently are considered as too big for anything short of the Federal Government to solve. While it is, of course, apparent that governments must attempt to solve problems of a political nature, most of the problems which will confront us after victory will be found essentially business problems and the business man is better equipped to handle these adjustments efficiently than are politicians. In an address by Frank P. Doherty, president of the Los Angeles Chamber of Commerce, on the subject of "The Place of Business," delivered at the annual meeting of the National War Council, held in New York last April, the speaker declared that, "You will find groups of business men who say, 'The problems of the future are too big for us; the government must take over. The responsibilities are too great to find employment for all the people. The task is too great for private enterprise to find the money with which to finance these undertakings. The government must take over'."

Continuing, Mr. Doherty said that, "This is the philosophy of defeat . . . Are we in 1943, the wealthiest nation in all history, one that has built up the finest industrial system in all the world, an industrial system that has brought happiness and prosperity to our people in times of peace and is now the greatest producing force of weapons in all the world to preserve our liberties—are we going to say that although yesterday you were our servant, tomorrow you will be our master? That is the philosophy of defeat, and, unfortunately, has been accepted by many business men. It is based on the theory that we have reached our maturity, that we have stopped growing, that we are static, that there is nothing else to be done now except divide up what we have. Why, we haven't started to grow."

In his discussion of recent trends, Mr. Doherty said in part that, "About ten years ago those in charge of our government, during a national emergency, began to change our economic system, and they have been changing it ever since. The plans are to make the change permanent. Instead of increasing production there came the new school of controlled and limited production. Instead of free competition we were given fixed prices. They tried the NRA, that so many of you business men grasped at only to find it defrauded you. The plan was to equalize wealth—to cut down the peaks and raise the valleys, but we discovered that in lowering the peaks we also lowered the valleys. We found also that when we cut down production, when we fixed prices, when we put industry in a strait jacket, when labor, industry and business became dependent upon government, then free enterprise stagnated, wealth decreased, and opportunity was discouraged and initiative destroyed. This, in brief, is the history of the past ten years.

Declaring that it was primarily the abandonment of the principles and fundamentals of free enterprise in the '20's, when all of our population—business men as much as others, instead of using their reserves and profits for production, modernization of their plants and wider distribution of their production, went into the business of speculation and gambling, that resulted in inflation. The new school seized upon the resulting crash and said, 'See what private enterprise has done? It has brought unemployment to millions. Now the government must take over and find employment for and bring prosperity to all. Your system is a failure.' They did not tell you that even at the depths of the depression those on relief in the United States had better homes, more food and better living conditions than the average citizen in the socialistic state-dominated countries whose system they were attempting to introduce and copy in the United States. They did not tell you that the money they used to relieve unemployment, to build public works, to feed the distressed came from the reserves built up under the system of free enterprise and that free enterprise was to pay the taxes to furnish the funds for the program in the future."

Asserting that profits are necessary, Mr. Doherty said in part: "We should not judge the future by present conditions. Business men, laboring men, and agriculturists, we are now living in a false security Our wartime prosperity is artificial. It has three abnormal elements—one great fiscal agent, the government; one great employer, the government; one great purchaser, the government. This is as it should be, because in war we are producing weapons for our government to destroy our enemies and to save our country . . . In peacetime, however, free enterprise

depends upon profits. . . Which is the better way to bring about a solution of the unemployment problem —for you to use profits to expand your business to find new marks and thus fight depression, or for the government's tax collector to take your profits to use as the government dictates in relieving unemployment. The latter plan is equivalent to a policy that when business was bad you called in your production superindent and said, 'You're fired. We are going to turn this job over to the welfare department'." . .

In conclusion Mr. Doherty urged business men to "Get back to the conception of life that free enterprise runs parallel with free institutions, that when you surrender your economic life to your government, when you depend upon your government to find you employment, to find an outlet for your goods, to finance you, you are gaining a false security and you are losing your freedom."

W. G. Weston Acquires J. R. Booth, Ltd.

W. Garfield Weston has acquired J. R. Booth Limited with the exception of its Lumber Division. The purchase will be effective on August 31, 1943.

J. R. Booth Limited will carry on the business of its Pulp and Paper Division as in the past. No substantial changes in either products or policy are contemplated. Officers of the Company will be: chairman of the board, C. J. Booth; president, J. G. Fleck; general manager, H. D. Hyman; general sales manager, G. C. Winlow.

A new company, Booth Lumber Limited, has been formed to take over the present Lumber Division of J. R. Booth Limited, consisting of sawmills at Ottawa, Ontario, and Tee Lake, Quebec, and extensive sawlog limits in both provinces.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1943		Corresponding Weeks—1942	
July 3	84.7	July 4	67.6
July 10 (Holiday July 4)	67.1	July 11	69.7
July 17	87.6	July 18	81.5
July 24	90.5	July 25	79.2
July 31	91.5	Aug. 1	81.0
Aug. 7	*90.0*	Aug. 8	81.4

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1942	104.5	103.9	102.9	100.4	95.3	87.4	75.8
1943	87.2	88.9	89.5	88.7	91.5	86.5	*84.9*
Year		Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1942		80.8	82.8	90.6	86.9	80.1	90.4
1943		....	....	....	....	....	....

COMPARATIVE YEARLY SUMMARIES

	1936	1937	1938	1939	1940	1941	1942	1943
Year to Date..	77.8	87.6	68.0	78.6	86.9	93.8	94.8	*88.3*
Year Average..	80.4	79.8	71.5	83.4	85.6	97.4	90.4	....

*Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year	Avg.
1937	83	89	89	91	88	80	69	77	72	70	57	47	75	
1938	56	63	63	60	60	59	59	60	70	73	67	61	64	
1939	65	73	76	74	69	73	68	77	82	91	88	77	77	
1940	78	75	74	76	82	85	77	79	78	85	82	77	78	
1941	81	88	89	89	91	94	92	98	95	99	98	90	92	
1942	102	101	101	95	82	72	68	75	76	81	82	77	84	
1943	86	88	94	94	96	94	*89*	..	..	..	..	..	..	

Week ending July 3, 1943—92
Week ending July 10, 1943—69
Week ending July 17, 1943—91
Week ending July 24, 1943—97
Week ending July 31, 1943—97
Week ending Aug. 7, 1943—*94*

†Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

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"The diagram at the left indicates the actual position of the wire in the box. It is made to assist you in placing the wire on the machine."
TOP SHOULD RUN THUS
1 2 3

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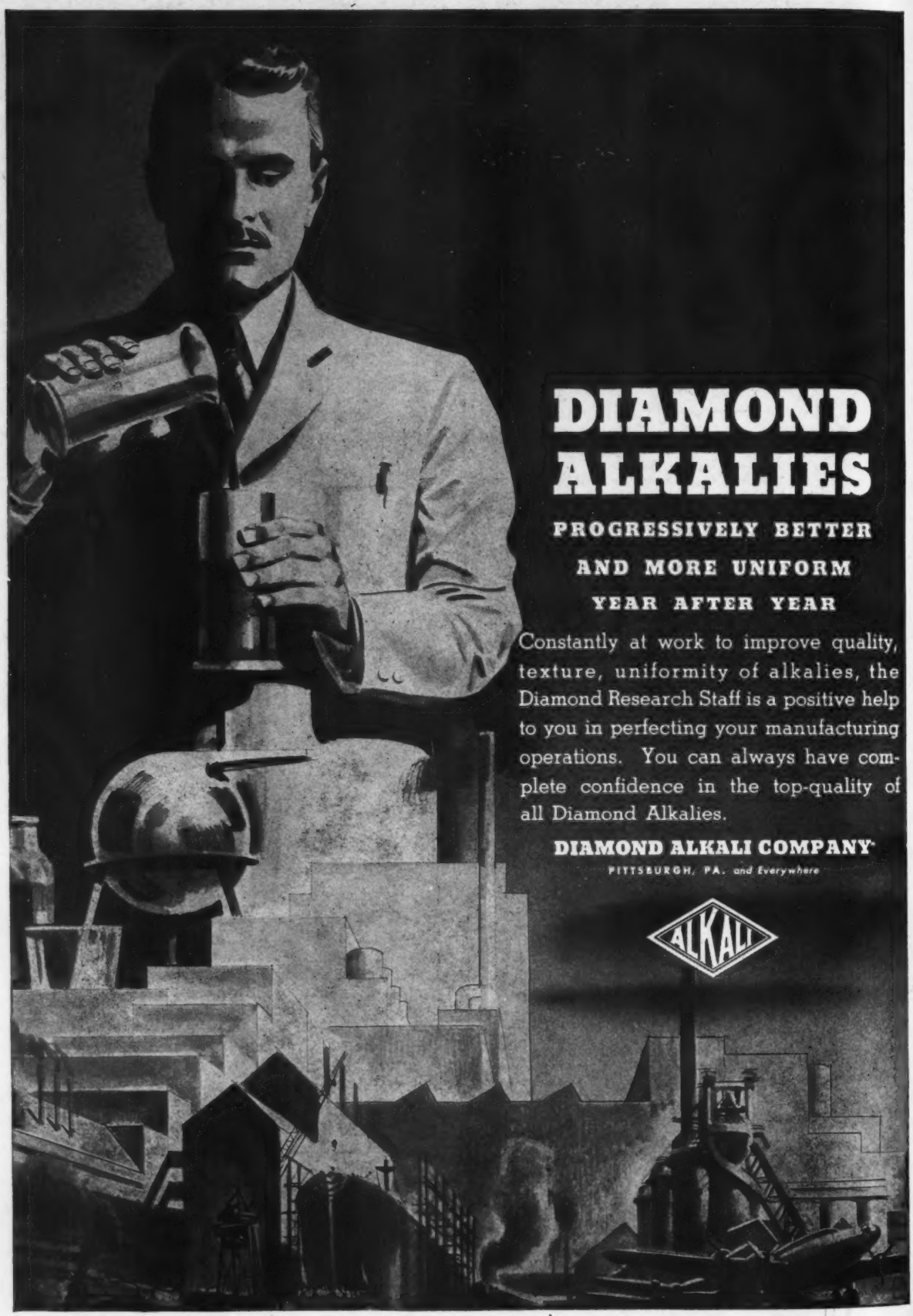
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Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY

Edited by R. G. Macdonald, Secretary

Properties of Lignin Esters

By John J. McNair[1] and Edwin C. Jahn[2]

Abstract

Nine organic, nine mixed and one inorganic ester of a coniferous lignin (lowland white fir) isolated by sulphuric acid were prepared. The organic esters, like the original isolated lignin are inert to common organic solvents, react to alternate treatment with chlorine and sodium sulphite until completely dissolved, and condense with phenol, aniline, and acetaldehyde.

Reesterfication of the lignin esters increases the saponification number with no corresponding increase in yield. Losses in lignin occur during esterification. No evidence of methoxyl cleavage is shown.

Various lignin preparations have been acetylated by a number of investigators in the course of studies into the structure of the lignin molecule. For example, Harris, Sherrard, and Mitchell *(4)* acetylated white spruce and sugar maple lignins prepared by treating wood meal with 70% sulphuric acid. The acetylated spruce lignin contained 19.5% acetyl, corresponding to five groups per molecular unit (890, unacetylated). The maple lignin acetate had 16.3% acetyle, corresponding to 8 acetyle per molecular unit (1800, unacetylated).

Besides the acetate a few other lignin esters have been prepared, such as the benzoyl, p-brombenzoyl, and p-nitrobenzoyl esters of straw alkali lignin *(1)*. Little effort has been made to study the properties of the lignin esters as a class, however.

Preparation of the Esters

The source of wood and lignin for this investigation was a sound specimen of lowland white fir (*Abies grandis*, Lindl.) cut near Potlach, Idaho. After air-drying the wood was reduced to wood flour and the 40-40 mesh fraction retained for study. This wood flour was extracted in batches for 16-20 hours in a modified Soxhlet apparatus with benzene-alcohol (2:1). The excess benzene-alcohol was driven off by distilling from a water bath and the wood flour extracted with water for six hours on a boiling water bath. The extracted flour was air-dried and then dried at 105°C. Analysis of the extracted wood flour by the cold 70% sulphuric acid method *(8)* showed the presence of 31.08% lignin.

Preparation of the Lignin

The lignin for most of the ester preparations was obtained by application of the above analytical method *(8)*, using cold 70% sulphuric acid, to larger quantities of material. Seventy per cent (by weight) sulphuric acid (12. ml. per gram of dry wood flour used) was cooled to 10°C. in a suitable flask. Previously cooled wood meal (150-235 grams) was slowly added with constant mechanical stirring. When all the flour was added, the flask was tightly stoppered, shaken briskly until genatinization had occurred, and placed in the 10°C. chamber. It was shaken at half-hour intervals for the next 2 hours and then allowed to stand at 10°C. for 14 hours. The acid mixture was then poured into 40 liters of cold distilled water in a carboy. After thoroughly stirring, the lignin was allowed to settle out. Most of the supernatent liquid was siphoned off through a filter. The volume of acid mixture remaining was measured and made up to 3% sulphuric acid by volume. The lignin in 3% sulphuric acid was then boiled four hours under a reflux. After filtering, the lignin was washed with hot water until free from all traces of sulphuric acid, dried overnight at 65-70°C. and then in a desicator. This lignin, in common with sulphuric acid isolated lignins, is termed Klason lignin.

A few esters were prepared from ethanol lignin obtained by the method of Kleinert and Tayenthal *(7)*. Wood flour was heated in an autoclave with 50% ethanol (by weight), using 15 ml. per gram of wood flour. The heating period was 4 hours at 165°C. or at 180-190°. After heating, the autoclave was cooled to 70°C., opened and the alcohol solution filtered off. A yield of 9% lignin was obtained at both temperatures used.

Preparation of Lignin Acetate

Lignin acetate was prepared as described by Wedekind, Engel, Storch, and Tauber *(10)*. Ten grams of lignin were added to a mixture of 50 grams of acetic anhydride and 75 grams of pyridine. After standing 8 hours at 0°C. the mixture was poured into 1250 ml. of ice water, filtered, washed with water, and dried at 105°C. The yield was 120.2% of the lignin used. A second preparation differing only in that the mixture was allowed to stand 8 hours at room temperature gave a yield of 120.8%. A third preparation was made in which the reaction mixture was heated for one hour on the steam bath. The yield in this case was 123.1%. For the analyses the three preparations were thoroughly mixed and washed with hot alcohol and cold ether.

Preparation of Lignin Succinate

Lignin succinate was prepared in a similar manner to the acetate. Twelve grams of lignin, 60 grams of succinic anhydride and 90 grams of pyridine were mixed and heated on a steam bath for one and one-half hours. The mixture was then poured into 1250 ml. of ice water, washed with water until the pyridine

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odor disappeared, and then washed with cold alcohol and ether. The yield was 123.3%

Preparation of lignin esters by using the acid chloride

The chloracetate, butyrate, crotonate, oleate, benzoate, cinnamate, and furoate esters of lignin were prepared by the use of the corresponding acid chloride. The method used was similar to that of Kita, Sakurada, and Nakashima *(6)* for the preparation of cellulose esters. Lignin was placed in a flask, then the benzene, acid chloride, and pyridine added in the order named. The flask was immediately stoppered, shaken well, and then placed under a reflux, where it was heated by a steam bath for 24 hours. The mixture was then filtered through a Buchner funnel, washed with 150-200 ml. of hot benzene, then with hot alcohol until the filtrate was colorless, and finally with a little cold ether. The product was then spread on a watch glass and dried in a vacuum dessicator.

The ratio of materials used was the same in each case, namely: 12 ml. benzene, 3 ml. pyridine, and 6 grams acid chloride for each gram of lignin used. The yields are listed in Table I. The benzene and alcohol washings were colored in all cases, so that a soluble fraction of the esters may have been lost and the yield values may be low.

Preparation of Lignin Nitrate

Lignin nitrate was prepared by the method of Fischer and Tropsch, as given by Fuchs *(3)*. Lignin (14.8 grams) was thoroughly mixed with 150 ml. of 5*N* nitric acid. The mixture was heated for one hour at 60-62°C., cooled, filtered by suction, and washed thoroughly with distilled water.

Reesterification of Lignin Esters

Five to ten gram portions of the benzoate, crotonate, furoate, butyrate, acetate, and succinate esters of lignin were reesterfied exactly according to the original esterfication, the same ratio of materials being used in each case. The yields, based on the weight of the original esters used, are shown in Table I.

Acetylation of Lignin Esters

Portions of the lignin esters (one treatment) were acetylated in the same manner as the acetylation of the original lignin. Two to 2.5 grams of the ester, 11.5 ml. of acetic anhydride and 20 ml. of pyridine were mixed and heated for one hour on the steam bath in each case. The yields, based on the weight of the original esters used, are shown in Table I.

Esterification of Wood

Lowland white fir wood flour was esterified with acetic anhydride, crotonyl chloride and with benzoyl chloride in the same manner as lignin. The yields, based on the weight of the original wood are given in Table I.

TABLE I.—YIELDS OF ESTERS RECOVERED

	Yield, %	Reesterification Yield in % original ester	Acetylation Yield in % original ester
Klason Lignin acetate	120.2	100.7	100.7
	120.8		
	123.1		
succinate	123.3	100.3	101.2
oleate	135.6	....	107.4
benzoate	134.3	102.4	99.9
butyrate	124.2	98.3	93.9
cinnamate	157.8	...	97.3
furoate	140.0	96.6	93.9
crotonate	148.8	106.6	84.0
chloroacetate	161.3	....	87.3
nitrate	96.6	....	96.3
Ethanol Lignin acetate	122.4		
benzoate	41.7		
Wood acetate	129.0		
crotonate	146.6		
benzoate	196.1		

TABLE II.—BEHAVIOR OF LIGNIN ESTERS TO CHLORINE-SODIUM SULPHITE

Material	Weight of Sample grams	No. of Chlorinations to End Point	Residue %	Remarks
Klason lignin	.3083	17	0.06	
	.4876	17	0.06	
	.6098	18	0.07	
Klason lignin				
acetate	.3380	9	0.68	
	.4406	9	0.66	
butyrate	.2286	8	trace	
oleate	.2412	14	trace	Soluble in hot Na_2SO_3
crotonate	.1642	5		
cinnamate	.1040	15	trace	
succinate	.2232	4	trace	Slightly soluble in cold Na_2SO_3
benzoate	.2053	15		
furoate	.2202	9	trace	
nitrate	.5737	1	trace	
			none	Soluble in cold Na_2SO_3
Wood acetate	.3113	10	59.88	

Examination of the Lignin Esters

Behavior of Lignin Esters to Chlorine-sodium Sulphite

The solubility of the lignin esters when treated alternately with chlorine gas and a 2% sodium sulphite solution was determined according to the U. S. Forest Products Laboratory method *(2)* for the determination of cellulose (Table II).

Solubilities of Lignin Esters

The qualitative solubility of the lignin esters and the original lignin was examined in 41 solvents and 6 solvent combinations. The solubilities were determined both at room temperature and at 100°C., except for those solvents which boil below 100°C., and for those which have a higher melting point. In the latter case, the material was warmed over a flame. The solvents used were acetone, ethanol, chloroform, glacial acetic acid, ethyl acetate, pyridine, benzene, diethyl ether, ethylene glycol, 10% aqueous sodium hydroxide, aniline, phenol, phenol plus small amount of iodine, vinyl acetate, bornyl acetate, amyl acetate, crotonaldehyde, paraldehyde, acetaldehyde, nitrobenzene brombenzene triethanolamine, cyclohexanol, lactic acid, glycerol, ethylene chlorhydrin, diisobutylene, carbon bisulphite, oleic acid, acidified phenol, acidified glycerol, napthealene, diphenyl, diphenylamine, cinnamic acid, thiouria, urea, benzophenone, acidified ethylene glycol, furfural, and furfural plus a small amount of sodium hydroxide. In addition, the following combinations of solvents were used: ethanol-acetone, ethanol-furfural, ethanol-furfural-benzene, phenol-aniline, phenol-aniline-ethanol, and phenol-ethanol-oleic acid.

The solubilities of the lignin esters were quantitatively determined in phenol containing the condensation promoting catalyst, iodine. Into a test tube were placed 0.5—1.0 gram of the material and 35 ml. melted phenol, containing iodine in an amount equal to 1% of the weight of the phenol. The mixture was heated 14-16 hours at 105°C. and then filtered through tared filter paper. The residues were washed with absolute ethyl alcohol until colorless, dried at 105°C. and weighed. The filtrates were heated to drive off the alcohol, and the phenol solutions then poured into 10-15 times their volume of benzene. The precipitates were collected on tared filter papers, washed with benzene, dried at 105°C. and weighed. The yields are given in Table III.

TABLE III.—SOLUBILITY OF ESTERS IN PHENOL

Klason Lignin Ester	Insoluble Residue, %	Soluble in Phenol and Precipitated by Benzene, %	Total Phenol-Lignin Ester Recovered, %
Acetate	99.80	3.83	103.63
Butyrate	13.47	64.40	77.87
Oleate	36.31	18.85	55.16
Crotonate	99.82	15.59	115.41
Cinnamate	27.40	57.82	85.22
Succinate	7.10	88.69	95.79
Benzoate	2.39	77.78	80.17
Furoate	69.71	10.82	80.53
Nitrate	43.43	57.79	101.22
Chloracetate	85.37	23.80	109.17
Unesterified lignin	0.58	87.54	88.12
Original wood	27.49	10.52	38.01

Methoxyl Determinations

The methoxyl values of the lignin esters were determined according to the Zeisel method, using the apparatus and modifications of the U. S. Forest Products Laboratory *(2)* (Table IV).

Saponification Numbers and Ester Values

The saponification number was determined by heating 0.2-0.6 grams of lignin ester with 25 ml. of 0.5*N* alcoholic potassium hydroxide under a reflux on a steam bath for one hour. The mixture was then allowed to stand for 20 hours at room temperature. Thirty milliliters of 0.5*N* sulphuric acid were then added, the solution allowed to stand 4 hours, after which it was filtered and the residue washed 3 times with 25 ml. portions of hot water and 3 times with 25 ml. portions of ethanol. The filtrate or an aliquot part of it was then titrated and the amount of potassium hydroxide required to neutralize one gram of the sample was calculated. From this saponification number the per cent ester group (RCO) present was calculated (Table IV).

Condensation with Acetaldehyde

A number of the lignin esters (0.3-0.5 gram) were placed in glass tubes, each with 2 ml. of paraldehyde and 1-2 drops of concentrated hydrochloric acid. The tubes were sealed and heated for one hour at 125-135°C. After cooling, the contents were filtered through tared filter papers and the residues washed thoroughly with acetone, dried at 105°C., and weighed. The acetone filtrates were each poured into 400 ml. of water. The precipitates were collected on tared filter papers, washed with water, dried at 105°C., and weighed. The results are listed in Table V.

TABLE IV.—METHOXYL AND ESTER GROUP VALUES

Material	Methoxyl, %	Saponification No., grams KOH	RCO Groups Determined by Saponification, %	RCO Groups Calculated from Methoxyl, %	Methoxyl Basis Deesterified Lignin, Calculated from Saponification, %
Unesterified Materials					
Lowland white fir wood	5.68	.0188	1.44 [1]	....	5.76
Klason lignin	16.27	.0078	0.60 [1]	....	16.37
Ethanol lignin	14.03	.0761	5.86 [1]	....	14.90
Klason Lignin Esters					
Acetate	12.05	.2699	20.69	25.97	15.20
Acetate, reesterified	12.10	.3072	23.55	25.66	15.85
Chloracetate	8.80	....	....	45.91	....
Chloracetate, acetylated	8.28	.2184	....	49.11	....
Butyrate	10.62	.2800	35.50	34.78	16.45
Butyrate, reesterified	6.12	.2799	35.42	66.42	9.49
Butyrate, acetylated	8.07	.2864	35.92	50.40	12.61
Oleate	10.32	.1181	55.88	36.60	23.40
Oleate, acetylated	7.62	.2766	68.05	53.17	23.70
Crotonate	9.55	.2852	35.14	41.33	14.72
Crotonate, reesterified	8.67	.3412	42.14	46.10	15.00
Crotonate, acetylated	10.72	.2949	35.83	34.14	16.71
Cinnamate	8.53	.2336	54.64	47.60	18.77
Cinnamate, acetylated	7.83	.2382	54.90	51.87	16.28
Succinate	11.11	.3504	31.60	31.71	16.24
Succinate, reesterified	10.28	.4197	37.86	33.85	16.54
Succinate, acetylated	10.75	.4242	37.27	33.96	17.13
Benzoate	7.86	.2111	39.58	51.72	13.02
Benzoate, reesterified	6.01	.2597	48.53	63.06	11.71
Benzoate, acetylated	6.07	.2663	43.74	62.69	10.80
Furoate	8.89	.2336	39.63	45.39	14.72
Furoate, reesterified	7.31	.2438	41.29	55.07	12.48
Furoate, acetylated	9.99	.2934	44.13	38.60	17.99
Nitrate	6.87	....	....	57.79	....
Nitrate, acetylated	5.46	.3799	....	66.44	....
Ethanol Lignin Esters					
Acetate	11.25	.4525	34.68	19.81	17.22
Benzoate	5.02	.2868	53.68	64.22	10.84

[1] Calculated as acetyl groups.

TABLE V.—REACTION OF KLASON LIGNIN ESTERS WITH ACETALDEHYDE AND WITH ANILINE

Material	Aldehyde-Lignin Residue Insoluble in Acetone, %	Acetone-Soluble Aldehyde-Lignin Fraction Precipitated by Water, %	Total Yield Aldehyde-Lignin Ester, %	Methoxyl in Aldehyde-Lignin Ester, %	Aniline-Lignin Ester Condensation Product Recovered, %	Methoxyl in Aniline-Lignin Ester, %
Unesterified lignin	140.35	0.78	141.13	8.39	109.36	13.70
nitrate	104.65	43.55	148.20	....	92.92	....
succinate	113.76	11.25	125.01	8.46	95.86	10.90
crotonate	83.85	6.71	90.56	....	85.08	....
butyrate	115.71	23.75	139.46	....	96.23	....
benzoate	130.65	9.45	140.10	7.35	70.38	7.03
Paraldehyde (blank)	0.00	39.13	39.13	....	.....	....
Aniline (blank)	.....	....	.....	....	Completely soluble in benzene	....

Condensate with Aniline

One-half gram samples of a number of the lignin esters were sealed in glass tubes, each with 2 ml. of aniline. The tubes were heated one hour at 180-185°C. After cooling, the tubes were opened and the contents poured into benzene. The precipitates were collected on tared filter papers, washed thoroughly with benzene, dried at 105°C., and weighed. The yields are given in Table V.

Discussion of Results

The amount of lignin in extracted lowland white fir wood is 31.08%. Since the methoxyl content of the wood is 5.68%, the total methoxyl content of the lignin *in situ* is 18.27%, assuming that the total content of the wood is in the lignin. Since the Klason lignin isolated in this work had a methoxyl content of 16.27%, 89% of the total methoxyl is present in the isolated lignin. This is in close agreement with Harris, Sherrard, and Mitchell *(4)* who isolated white spruce lignin containing 88% of the total methoxyl in the wood.

All the organic esters of lignin like the original unesterified lignin are relatively inert to organic solvents, none being soluble in common solvents: Solvents capable of forming derivatives with lignin showed varying degrees of solvent power for the esters on the basis of qualitative tests. Aniline has a slight solvent action on the original lignin and on the chloracetate and nitrate. Acetaldehyde appeared to react and form resinous products with lignin acetate, crotonate and succinate. The esters and the original lignin showed some degree of solubility in hot phenol containing iodine. The original lignin is almost completely soluble, the benzoate, succinate, and butyrate are highly soluble, the oleate, cinnamate, furoate, chloracetate, and nitrate are moderately soluble, whereas the crotonate and acetate are least soluble (Table III).

Nitrated lignin shows some solubility in acetone, ethanol, pyridine, lactic acid, ethylene chlorhydrin,

acidified phenol, furfural, and furfural-ethanol. It is very soluble in 10% sodium hydroxide and in hot glycerol and appeared to react with thiourea, aniline, and phenol-aniline-ethanol.

The wood esters are also insoluble in all the common organic solvents, including those which dissolve cellulose esters. This inertness to organic solvents on the part of wood esters was observed by Suida *(9)* and Horn *(5)* in the case of wood acetates.

The lignin esters of organic acids also behave similarly to the original lignin towards alternate treatments with chlorine and sodium sulphite. The presence of ester groups, in fact accelerates the rate to complete disappearance of the lignin product. The nitrate again behaves abnormally, disappearing after only one treatment (Table II). Since lignin esters completely dissolve by chlorine-sodium sulphite treatment, it may be assumed that the Cross and Bevan analysis may be applied to esterfied woody tissues.

An analysis of the figures in Tables I and IV show that we are probably not dealing with the complete lignin product, but that evidently some losses have occurred during the preparation of the lignin esters and their purification by organic solvents. For example, yields on reesterification and on acetylation of the original esters show only slight increases in 4 cases, no appreciable change in 4 cases, and a decrease, which is often considerable, in 8 cases. Yet with the exception of the butyrate, a second esterification treatment raises the saponification number and ester content quite appreciably. Losses, therefore, are incurred by partial degradation or by partial solution of the product by the esterifying medium or the subsequent organic solvent washes or both. Undoubtedly, therefore, the yield values in Table I for the percentage ester obtained after one esterification are also lower than would be the case if all the lignin were recovered as the ester.

Calculation of the apparent ester content (R—C = O) from the methoxyl values gives figures which show no agreement with the actual ester content as determined by saponification (Table IV). Conversely, calculation of the methoxyl content based on the deesterified lignin) from the saponification values gives values which do not in all cases fall near 16.37%, which is the value the Klason lignin derivatives theoretically should have. The fluctuations in both the calculated ester and methoxyl values from the real values indicate that changes have taken place during the esterification treatment. When considered in the light of the losses in yield, it seems most probable that a selective fractionation or a partial degradation of the lignin has occurred with loss of portions having different methoxyl content than that of the total original lignin.

There is no evidence that methoxyl groups are split off during esterification. If that were the case, the methoxyl values of the Klason lignin esters (basis of the deesterified lignin) as calculated from the saponification values, would all be lower than 16.37%. Actually there is an apparent increase in methoxyl in some cases. If a distribution curve of the calculated methoxyl content versus the number of esters (21 Klason lignin esters) is drawn it is found that the probability is greatest that the methoxyl content will be the same as that of the original lignin, namely, in the neighborhood of 16%. The other methoxyl values will lie both above and below this most probable value. The irregular methoxyl values, therefore, are not likely due to cleavage of these groups during esterification but to irregular losses of lignin material by fractional solution or degradation during the preparation of the esters.

When Klason lignin or its esters are heated under pressure with paraldehyde containing hydrochloric acid, a condensation reaction takes place, the yields of acetone insoluble product being over 100%, except in the case of the crotonate. Condensation with aniline apparently also occurs, although a portion of the product apparently is not recovered by precipitation in benzene (Table V). Methoxyl values of the aldehyde and aniline condensation products of Klason lignin and its succinate ester are appreciably less than the corresponding values of the original materials. There is no appreciable decrease in the case of the benzoate, however.

Esterified lignin, although less soluble than the original lignin in hot phenol containing iodine, nevertheless is still capable of condensing with the phenol. In the 5 cases analyzed, all the lignin esters soluble in phenol and precipitated by benzene have much lower saponification numbers than the original esters (Table VI). The fractions insoluble in phenol show no consistent relationship in ester content, some having higher and some lower values than the original ester.

Conclusions

The solubility, physical appearance, and general chemical properties of organic esters of a coniferous lignin (lowland white fir) isolated by sulphuric acid are similar to that of the unesterified lignin. Like the original lignin, the esters are inert to ordinary solvents, condense with phenol, aniline and acetaldehyde, and react to alternate treatment with chlorine and sodium sulphite until completely dissolved. The wood esters are also inert to common organic solvents. Nitrated lignin, on the other hand, is soluble in a number of solvents and appears to be more reactive than the organic esters.

Preparation of lignin esters by the methods used, results in some losses of material, either through partial degradation and solution or by a fractionation of the product by the esterifying medium or the subsequent organic solvent washes or both. That losses have occurred is shown by higher saponification numbers after a second esterification, unaccompanied by any corresponding increase in yield. In fact, losses in yield frequently occur after a second esterification. These losses in lignin material result in products showing an irregular relationship between the methoxyl and ester values, when the calculated values are compared to the real values. Nevertheless the distribution of the calculated methoxyl (on the basis of the deesterified lignin) for 21 products shows that

TABLE VI.—SAPONIFICATION VALUES OF KLASON LIGNIN ESTERS AFTER REACTING WITH PHENOL

Material [1]	Saponification No. grams KOH	R C O Groups Determined by Saponification, %
Lignin (Sol.)	.0312	2.39
Acetate (Insol.)	.2420	18.55
Shloracetate (Insol.)	.2277	31.28
" (Sol.)	.1633	22.56
Butyrate (Sol.)	.1291	16.34
Oleate (Insol.)	.1491	70.43
Crotonate (Insol.)	.2108	25.93
" (Sol.)	.2410	29.64
Cinnamate (Insol.)	.3209	74.93
" (Sol.)	.1235	28.85
Succinate (Sol.)	.2120	15.87
Benzoate (Sol.)	.0976	18.27
Furoate (Insol.)	.2207	37.37
Nitrate (Insol.)	.2557	18.23
" (Sol.)	.1290	9.20

[1] "Insol." and "Sol." refer respectively to material insoluble in phenol and to that which is soluble but precipitated by benzene.

the probability is greatest for a value similar to that of the true value in the original lignin. Therefore, cleavage of methoxyl groups probably does not occur.

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Efficient Reuse of Process Water*

By H. A. Morrison[1]

Abstract

Process water for pulp and papermaking comes into the mill from streams, lakes, or wells and must often be filtered and conditioned before use. Water from any source costs money and when leaving the mill, represents a considerable loss because of stock content, sensible heat, and valuable materials in solution.

The function of vacuum filters to reduce fresh water demand by making water already in the mill system suitable for reuse is covered in detail and data for each specific application are given.

Water conservation is discussed according to experience in (a) deinking, (b) container board, (c) newsprint, and (d) paper manufacture. Countercurrent washing methods on (e) alkaline pulp, (f) bleaching, and in (g) causticizing are described.

Process water, its treatment for use, quantity required, and methods of analysis, for our industry, is ably discussed in TAPPI Monograph Series No. 1. "Industrial Water for Pulp, Paper, and Paperboard Manufacture"*(1)*.

The objective in most mills as operated a few years ago, was to minimize loss of fiber when large volumes of water were discarded from each department. It is now known that efficient removal of fiber will commonly permit direct reuse of the water in the same or in preceding steps of manufacturing, with consequent reduction of outside water demand. We now reason that *water* is really water; that it *costs money;* that it's rejection from mill circuit entails serious loss of *heat units, chemicals, colors,* and *fillers,* in addition to variable amounts of fiber. Reduced flow to sewers nearly always means less shrinkage.

Pulp and paper mills usually make money directly from correction of their disposal methods to harmonize with informed intelligent public opinion.

In practical terms, process water must approach the purity of outside supply, or nearly so, before it may be thrown away. Why not largely reuse the purified water? Mills of all types are doing so and finding it profitable.

Contrary to popular opinion, it is sometimes unfortunate for a plant to have an unlimited supply of fresh water. Best efficiency in water usage, with no particular cost burden, is often found where water supply is limited.

TAPPI Report on Process Water

Wide variations in water used at six unbleached kraft pulp mills, (TAPPI Special Report 298), very well support our conclusion that many operators would gain by curtailing water flow in and out of their mills. The six mills reporting all make the same product, but while average water per ton amounts to 34,600 gallons, one plant reports 57,000 gallons, and another only 11,000 gallons. Total value of materials carried away in effluent water is broadly proportional to volume of water wasted, thus greater uniformity in water demand would be expected.

Cost of Water

The actual cost per million gallons of process water, including filtration and chemical treatment for the 81 mills listed in TAPPI Special Report 298 ranges from $0.55 up to more than $30.00, and the general average is $11.00. Kraft paper mills on wrapping, bag and liner grades, when using the average 36,100 gallons water per ton of product, with process water costing $3.00 per million gallons, expend 10.8 cents for water to make each ton of product. Accordingly a 500-ton mill spends annually more than $17,000 for paper mill water. Consider the size of this item when water costs run up to over $30.00 per million gallons.

In fine paper mills reduced use of outside water contributes to cleaner paper. Average process water at its best will bring in dirt in suspension and undesired materials in solution. Sand filter efficiency increases as rate of flow is reduced. By using less water we produce a sheet of lower dirt count because the incoming water is of greater purity.

General experience in pulp and paper mills leads to the conclusion that it is necessary to waste a limited portion of mill circuit water to prevent accumulation of dissolved substances. Spilling from the system will not obviate the proven need for chlorine, chloramine, or other treatment, to limit and control slime growth. For best average results it is deemed generally desirable to (1) introduce comparatively little outside water, (2) minimize slime formation by chemical treatment, (3) practice good housekeeping to periodically remove slime and dirt, and (4) discard continuously enough clarified white water to balance the net addition of outside fresh water.

In the following discussion, an effort is made to show for each of the several pulp and paper mill operations, just how the above mentioned basic principles, have been practically applied in existing mills.

(A) Deinking

In a mill where old book papers are defibered by cooking in a soda ash solution in a batch beater for

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[1] Oliver United Filters, Inc., 33 W. 42nd St., New York, N. Y.

use in coated paperboard, the effluent hot water from a vacuum filter is reused in the beaters. The filter takes feed at 1.66% consistency and 175° F., discharges pulp at 22% and returns 600 g.p.m filtrate when handling 65 tons of old papers per day.

Reuse of the hot filtrate cuts soda ash demand 50%, sharply reduces steam consumption, and lowers both filler and fiber losses, as compared to the open system formerly employed.

In another deinking plant where full white book papers are manufactured, conventional couch roll decker-washers are preceded by a vacuum filter. Water from the three stage washer is passed counter current against the flow of stock back to the filter feed. All effluent water and all removed carbon goes direct to sewer from the filter. There is no other waste outlet for this deinking system.

As compared to conventional washing systems, the one described above has dropped shrinkage down to 10%, as against the previous 25%.

Bleach washing of deinked book stock on vacuum filters is an example of efficient use of wash water coupled with high recovery of fiber and filler. The water-effluent from the filter can all be reused in the deinking and screening steps.

(B) Container Paperboard

Many container paperboard mills have installed vacuum filters following rifflers or hydrapulpers. Board machine white water returns to the filter feed and the mixture comprises all of the filler stock plus all of the excess mill white water. Feed consistency may be as low as 0.50% but commonly averages 0.80-1.0%.

In a 100-ton mill the filter feed is about 2100 g.p.m. Stock to machine chest at 4% consistency amounts to 420 g.p.m. Filtrate is automatically separated into a "cloudy" fraction of 420 g.p.m. at 0.02% consistency and a "clear" portion of 1260 g.p.m. at 0.004 to 0.006% consistency.

Temperature drop across the filter does not exceed 2° F. provided filtrate is used throughout the mill excepting when running white liner grades. On liner cylinder showers on patent coated board, fresh water is advised.

Cloudy filtrate is used to dilute stock at breaker beater or pulper after being heated to desired temperature, about 175°F.

Clear filtrate is pumped to felt showers, inside cylinder showers and to screens, jordans, and consistency regulators. A portion of this clear filtrate, amounting to less than 500 g.p.m. in a 100-ton container board mill, is sent to sewer. There need be no other water outlet. Chlorine is used for slime prevention, the rate being 0.5 pound per ton of board in a typical plant.

(C) Newsprint

Highly efficient reuse of process water is practiced in a 400-ton Canadian newsprint mill, where the paper mill and groundwood departments operate with a common white water system. This efficient mill wastes only 500 g.p.m. and shrinkage is less than 1% on paper production. This does not include water sewered by the sulphite pulp mill.

All groundwood deckers in the above mill are vacuum filters, arranged to split the filtrate into two fractions. The cloudy portion, amounting to about 25% of the total and at 0.035% consistency is used for thinning pulp prior to screening. Return white water from the paper machines is likewise introduced at the groundwood screen head boxes.

The clear filtrate fraction provides shower water for groundwood fine screens and for all shower purposes on the paper machines, excepting that fresh water is used in the Bird screen showers. The only flow to sewer is the overflow of the excess clear filtrate tank. This small stream averages about 0.016% moisture-free consistency, the solids being about 25% clay.

Decker feed at the above mill is at 118-120°F., filtrate averages around 112-116°F. and mixed stock to machine wires runs about 100°F. Stock at 2% consistency in the grinder canals is above 150°F. Slime growth is negligible in the combined groundwood and paper machine circuit as the high temperatures serve to sterilize the circulating water. Slime-producing organisims which come in with the wood are killed by the heat at the grinders. All large pipelines handling stock or white water are of Transite[2]. Fresh water, introduced at Bird screens, practically balances the volume of clear filtrate to sewer.

The above system provides fairly constant temperatures at the machine head box. The paper machines operate smoothly, with below 14% sulphite in the furnish at speeds above 1200 f.p.m. The sheet carries about 2% ash and its printing qualities are good.

(D) Savealls in Paper Mills

Process water for papermaking usually is sand filtered and chlorinated before such use. Chemical conditioning is often essential to remove colors and dissolved substances. Such costs are additions to pumping and distributing charges. Water may cost several dollars per million gallons, thus must be conserved in the interest of low-cost operations.

Water leaving the paper mill always carries away valuable fiber and heat units. Frequently color, alum, and fillers are lost. To minimize white water losses of all kinds including water, savealls of various types are employed. They should be able to efficiently handle the entire excess white water flow from the individual machine which they serve and to deliver the recovered materials into the machine chest at desired consistency (2-3%) uncontaminated by dirt, at a rate closely in step with machine production. Water from the saveall, to be suitable for general reuse must be sufficiently clarified so it can be utilized at the showers and elsewhere on the machine instead of outside water.

It is not possible to exactly define "white water suitable as a substitute for fresh water." Experience teaches that white water for paper machine general reuse must be clean and at best obtainable clarity within reasonable cost limits. Small inclusions of filler are not especially troublesome, for example, on a book paper machine. Long fiber in white water clogs nozzles, hence, is most undesirable in water for shower use. Return water must suit the needs of the paper machine from which it came.

When equipped with a saveall which satisfies all of the above conditions, the clarified white water to waste can be kept below 2000 gallons per ton of paper made. Paper machines of all types on many different grades of paper are running regularly with white water systems meeting all of the above specifications. They produce on grade papers at high

[2] Johns-Manville Co., New York, N. Y.

speeds without extra broke, shrinkage or lost time.

On one fourdrinier machine making 32.5 tons of hanging paper per day, actual flow to sewer averages 50 g.p.m. The vacuum filter saveall on this machine handles 600-700 g.p.m., of which more than 90% is directly recycled on the same machine. Filtrate averages 0.011% consistency on a variety of hanging and news grades.

For representative saveall results on the above machine see Table I.

TABLE I

Grade of Paper	Feed, %	Filtrate, % Solids moisture-free	Filtrate, g.p.m.
No. 2 Hanging	0.182	0.0062	815
No. 2 Hanging	.130	.009	860
No. 2 Hanging, 10-oz.	.140	.012	790
News	.135	.010	680
Rwy. folder	.324	.013	666
News	.135	.017	720
News	.181	.010	680
No. 2 Hanging	.479	.009	720
No. 2 Hanging	.381	.012	780
Averages		0.0109%	745

The saveall in question is a vacuum filter 8 feet diameter by 12 feet face, operated by barometric leg, with variable drum speed of 15-60 seconds per revolution.

(E) Black Liquor Washing

The water requirement is minimized in washing kraft or soda pulp for removal of black liquor, when countercurrent methods are employed.

No water comes into the system except as wash on the final stage of vacuum washers. Decker filtrate is pumped back for thining at screen head boxes and a portion may be heated for displacement of weak black liquor on the final vacuum washer. The remainder to waste need not exceed 1000 gallons per ton of pulp in the average mill, or 1500 gallons on kraft pulp cooked for bleaching where a rewasher may precede the flat screens.

Mills that follow the above procedure naturally realize an important steam economy at the evaporators since water flow into the circuit is kept at a minimum. For example in a kraft mill which cooks Southern pine for bleaching and blows its digesters at 15% consistency, with black liquor blown at 15°Be (corrected to 60°F), evaporator feed should be at or above 11.5°Be (at 60°F). The actual addition to evaporator feed because of washing is about 480 gallons per air-dry ton of pulp. Total washing losses of salt cake are 30-40 pounds per ton of pulp.

The methods described above, when compared to older practice, show a net saving of 1000-1500 gallons of process water per ton pulp. Incidental steam and salt cake economies are of extreme importance.

(F) Bleach Washing

Without reuse of white water, within practical limits, a multistage bleach plant requires a veritable river of high-purity process water. Many mills recycle most of the washer filtrate after hypochlorite bleaching but reuse after the washers on chlorinated or on caustic treated stock is unusual though deserving of more study.

In a six-stage kraft bleaching plant of 100 tons daily capacity, each washer must have about 200 g.p.m. high purity fresh water strictly for displacement washing on the sheet, the total thus being 1200 g.p.m. equivalent to about 17140 gallons per ton bleached.

Each washer produces about 1700 net g.p.m. filtrate. In order to maintain water balance, at least 1200 g.p.m. must be sewered, when in and out stock consistency for bleach plant is in balance. Additional outflow to waste is essential to eliminate foam and to maintain a stable concentration of bleach residues inside the plant and to insure high purity on finished stock. Water demand in practice is a matter of individual experience and preference. Under good average conditions in a 100-ton six-stage kraft bleaching plant the water to sewer can be kept as low as 2000 g.p.m. equivalent to 28600 gallons per ton pulp. With no reuse of bleach plant water, four times as much are required.

Assuming that stock is at 6% consistency in each treatment step and that feed to each washer is at 1%, amounting to 1680 g.p.m. then 1400 g.p.m. liquid must be introduced ahead of each washer for dilution of feed.

Recirculation of washer filtrate for thinning the feed of the same washer is permissible practice on the hypochlorite bleach filters and probably can be done on the chlorinated acid stock and after caustic treatment. When dissolved substances are at low concentration, as in washer filtrates and provided there is no reprecipitation or adverse color effect, their recirculation for dilution of feed on the same washer does not necessarily increase their inclusion in washed stock.

On vacuum washers, the water soluble impurities are removed by using clean fresh water to displace the liquid in which they are dissolved. By applying 200 g.p.m. to a pulp sheet which is at 10% consistency (1.08 gallons per pound pulp) and finally bringing cake back to 10% as it leaves the washer, we are using 50 g.p.m. in excess of the theoretical quantity to completely displace the liquid in the sheet. For best economy on wash water, agitation of the feed after thinning and before washing is desirable. This puts the water soluble materials quite completely into solution so they can be removed by direct displacement.

Table II, chlorinated sulphite pulp, not neutralized before washing.

TABLE II

	a	b	c	d	e	f	g	h
Feed consistency, % air-dry	1.53	1.00	1.19	1.39	0.96	1.01	1.60	1.16
Cake consistency, % air-dry	10.3	11.8	13.4	10.9	11.0	13.0	11.0	12.0
% Chlorides in feed *.	2.70	2.92	2.77	2.94	2.98	3.05	3.28	3.10
% Chlorides in cake *.	0.12	0.13	0.10	0.12	0.15	0.10	0.15	0.12
Washing efficiency, %	95.0	95.5	96.4	95.9	95.0	96.7	95.4	96.1

* Calculated to $CaCl_2$

Average tonnage over washer 240/24 hr.
Feed amounts to 19200 gallons per ton pulp at 1.25% air-dry.
Discharge at 11% equals 2180 gallons per ton pulp.
Filtrate from feed, 17020 gallons per ton pulp.
Wash water used, 400 g.p.m. all fresh outside water equals 2400 gallons per ton pulp.
Total filtrate including wash amounts to 19420 gallons to sewer per ton of pulp produced.

(G) Lime Mud Washing

Countercurrent washing for recovery of caustic at highest concentration is employed in all alkaline pulp mill causticizing systems. Most of the larger mills, 200 tons or more pulp per day, reburn the filtered washed mud to CaO for reuse. Many plants especially of small to medium capacity, sluice the washed mud to storage or waste with outside water.

In the kraft process, each ton of pulp produced requires the handling of about 900 pounds insoluble solids, mainly $CaCO_3$, as delivered to the final vacuum filter. Accordingly a 200-ton mill reburns or wastes around 90 tons dry basis mud per day. In such a mill, 25-30 g.p.m. wash water at 120-135°F

is used on the mud filter. For sluicing away the same tonnage of solids at 20% insolubles, 45 g.p.m. additional water are needed.

Sluicing mud away costs the mill 45 g. p.m. water and 750-1000 pounds soda (as Na_2O) every operating day.

When the lime mud is to go to a kiln for reburning, filter feed may be 35% insoluble solids in white liquor at around 2% total soda (as Na_2O). Cake may average 46% moisture and 0.50% total soda (as Na_2O) basis dry solids in cake. Actual soda loss in causticizing in a modern system equipped with kiln for reburning seldom exceeds 5 pounds (as Na_2O) per ton of pulp manufactured.

Filtrate from the mud filter goes back to the dissolving tank in the kraft mill. In the soda process, filtrate is normally sent to the black ash leaching cells.

From the above brief statements on causticizing, it will be evident that this department requires but little outside water because of straight line counter current use and reuse within the system.

Conclusion

Many classes of equipment can be and are used in addition to or instead of vacuum filters to condition water for reuse. Slush thickeners, gravity deckers, several different types of pulp washers and thickeners, gravity settling tanks, to mention a few only, all have to be considered when planning a modern water conservation system. In the present paper, the effort has been to show how water can be prepared for reuse in pulp and paper mills with the aid of filters. It is hoped that others will wish to present the case of other types of equipment now used or proposed for similar purposes.

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New TAPPI Members

The executive committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

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Ralph B. Beal, president, the Flox Company, Inc., Minneapolis, Minn., a 1919 graduate of University of Minnesota.

Dr. Norbert Bernheimer, chemical engineer, Brown Company, Berlin, N. H., a graduate of Technische Hochschule Darmstadt and Charlottenburg.

Dorothy L. Burk, routine chemist, Southern Kraft Division, International Paper Company, Mobile, Ala., a 1941 graduate of Alabama Polytechnic Institute.

Foster A. Burningham, research chemist and microscopist, Brown Company, Berlin, N. H., a 1918 graduate of University of Minnesota.

Henry J. Driscoll, chemical engineer, Scutan Division, Union Bag and Paper Corporation, Hudson Falls, N. Y., a 1934 graduate of Clarkson College.

Frank R. Forrest, sales engineer, Allis-Chalmers Manufacturing Company, Milwaukee, Wis., a 1920 graduate of Tri-State College.

Karl M. Guest, assist chief chemist, National Container Corporation, Jacksonville, Fla., at present, Pfc. chemical warfare service, U. S. Army, a 1936 graduate of Clemson College.

Martin L. Hamilson, chief chemist, Container Corporation of America, Chicago, Ill., a 1936 graduate of Indiana State College.

Dorothy Harper, chemist, Crossett Paper Mills, Crossett, Ark., a 1942 graduate of Georgia State College for Women.

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Nelson T. Joyner, technical assistant to the edible management, Lever Brothers Company, Cambridge, Mass., is a 1929 graduate of Virginia Military Institute.

George V. N. Morin, chemist, Resinous Products and Chemical Company, Philadelphia, Pa., is a 1935 graduate of Rensselaer Polytechnic Institute.

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Leonard Smidth, technical director of Plastics Division, Sylvania Industrial Corporation, New York, N. Y., is a 1925 graduate of Columbia University.

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Mark W. Weiss, technical service chemist, Amecco Chemicals, Inc., Rochester, N. Y., is a 1924 graduate of Harvard University.

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Cut of Paper to Printers Impending

WASHINGTON, D. C., August 18, 1943—Commercial printers and lithographers of the United States are faced with a further curtailment of print paper during the fourth quarter of 1943, it was revealed at a recent industry committee meeting in Washington. The estimated reduction of paper available to this industry is placed at 10%, giving them approximately 80% of the amount they used in 1942.

Anticipating the cut in supplies of printing paper, the WPB Commercial Printing and Lithographing Industry Advisory Committee recommended that a survey of the use of commercial printing papers be made to determine accurately the grades and amount of such paper needed, Philip S. Schneider, Assistant Director of the Printing and Publishing Division, and Government Presiding Officer of the Committee, said.

Robert D. Ross, formerly associated with R. R. Donnelly & Sons Inc., Chicago printers, has been appointed to conduct such a survey.

The continued shortage of fibre, it was pointed out, may cause some paper mills to shut down and further reduce the present inadequate supply of printing papers. Despite continuing efforts, there is no indication that pulp production can be sufficiently increased to meet the heavy demands.

Unless additional pulp and paper are produced or exacting conservation measures are adopted by the whole printing industry, it is possible that paper, like other essential materials and products, may have to be allocated sometime in the future, it was pointed out.

The commercial printing industry, which uses a million and a quarter tons of paper annually, has already effected certain economies by what is known as de-grading its paper-reducing weights where possible. Consumers of the better grades of paper must now de-grade further because of the critical shortage of virgin pulp.

Changes in Ceilings for Coarse Paper

WASHINGTON, D. C., August 18—After further consultation with the industry affected, through the Coarse Paper Merchants' Advisory Committee, the Office of Price Administration today made a number of changes in the regulation governing ceilings of distributors for several hundred coarse paper products.

These changes, reflecting OPA willingness to cooperate with industry in fashioning regulations, represent some of the revisions in the regulation that had been recommended by the advisory committee at recent meetings.

The changes, embodied in Amendment No. 3 to Maximum Price Regulation No. 349 (Distributors' Maximum Prices For Certain Coarse Paper Products) effective August 21, 1943, follow:

1. Butter chips, shelf paper, tray covers, chop-holders, bowl liners, paper skewers and waterproof papers are placed under the regulation. Previously they were under the General Maximum Price Regulation. Their ceilings, as determined by use of a mark-up table in the regulation, will be approximately the same as previously observed under the General Maximum Price Regulation.

2. Cups, sanitary closures and milk bottle caps are excluded from the regulation and returned to coverage under the General Maximum Price Regulation. Customary trade pricing methods can be followed by making this change. No alteration in ceilings will result.

3. A distributor has been re-defined as a wholesale paper merchant or jobber at least 35 per cent of whose total dollar sales is in paper and paper products. Previously the percentage was 51.

4. The definition of converting is reduced to the operations of cutting, wrapping, punching, slitting, rewinding or sheeting. Formerly every converting operation was included.

5. A provision is added to the definition of "amalgamated sale" which requires the distributor to continue to amalgamate sales in the same manner as practiced in March 1942.

6. Some pricing units have been revised to conform more nearly to customary trade designations. This will facilitate pricing by the distributor.

Bleached Kraft Committee Named

WASHINGTON, D. C., August 17, 1943 — Twelve representative members of the paper industry have been appointed to a sulphite and bleached kraft papers industry advisory committee, to advise OPA in connection with price ceilings on sulphite and bleached kraft papers.

The initial meeting of the committee will be held in New York at the Hotel Waldorf Astoria, August 18, when officers will be elected. William B. McGoldrick, chief, industrial papers unit, in the national office of OPA, and Henry J. Stein, of the legal staff in OPA's Paper and Paper Products Branch, will attend the meeting.

The committee follows: F. W. Cole, sales manager, Fraser Industries, Inc.; D. F. McCall, vice-president, Racquette River Paper Company; G. Stuhr, Sales Manager, Kraft and Specialty Paper Division, International Paper Company; H. O. Nichols, Manager New York Office, Crown Zellerbach Corporation, and R. I. Worrell, President, Mead Sales Company, all of New York City. A. Southon, sales manager, Kalamazoo Vegetable Parchment Company, Kalamazzo, Mich.; H. R. Telfer, president, Detroit Sulphite Pulp and Paper Company, Detroit; E. W. Kiefer, president, Port Huron Sulphite and Paper Company, Port Huron, Mich.; J. L. Madden, vice-president, Hollingsworth & Whitney Company, Boston; John H. Smith, president, Hawley Pulp and Paper Company, Portland, Ore.; I. N. Frisby, sales manager, Chicago Division, Nekoosa Edwards Paper Company, and F. P. Pandow, sales manager, Consolidated Water Power and Paper Company, both of Chicago.

Paper Service Co. Organized

Robert Bobowick, attorney, 280 Broadway, New York City, announces that George E. Edgett, of Winter & Lauerman, Inc, and Harry Rimberg, of Paper Converting Company, have entered into a partnership known as Paper Service Company with offices and plant at 295 Lafayette street, New York City.

Mr. Edgett has been closely associated with the paper industry for a number of years, specializing in the export of paper and paper products.

Paper Service Company will devote its efforts to the export, import and domestic sale of all types of paper, acting both as mill representatives and converters.

A complete plant for sheeting, slitting, rewinding, and the export packaging of paper and paper products is at the disposal of the industry.

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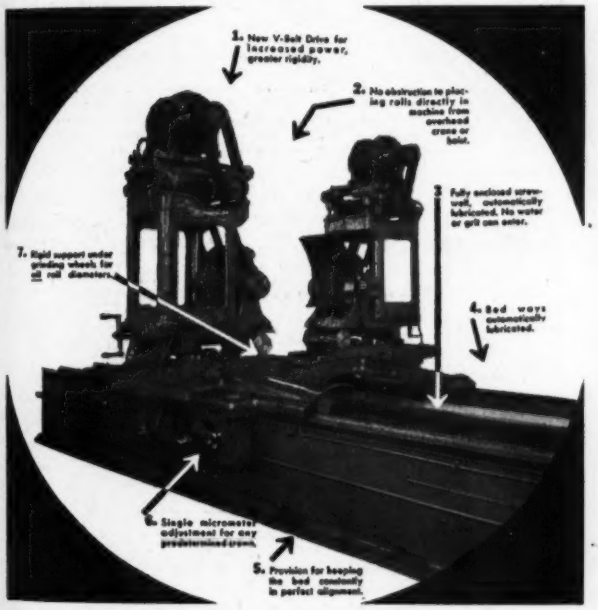
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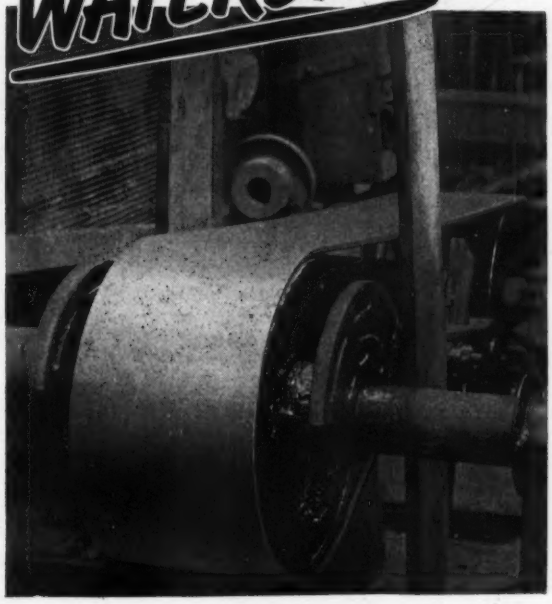

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New York Paper and Pulp Market Review

Paper Orders Continue to Rise Above 5% of Production For First Half Year—Price Adjustments Made in Unbleached Mitscherlich Pulp—Old Waste Paper Market is Strong—Rag Markets Active

Office of the PAPER TRADE JOURNAL.
Wednesday, August 18, 1943.

Orders in the wholesale paper market continue to rise above the 5% production level computed for the first half of the current year. Reports from many manufacturers' representatives, jobbers, and general paper merchants reflect concern at their inability to meet the rising tide in demand for virtually all kinds of paper and paper products. Labor shortages continue to disturb the balance of civilian trade, resulting in increasing transportation and delivery difficulties. No relief, unfortunately, can be expected under the stress and strain of the war effort.

The index of general business activity for the week ended August 7 declined to 141.7, from 142.4 for the previous week, compared with 132.0 for the corresponding week last year. The index of paper board production was 145.4, compared with 148.1 for the previous week, and with 120.1 for the corresponding week last year.

Paper production for the week ended August 7 was estimated at 90.0%, compared with 81.4% for 1942, with 99.7% for 1941, with 90.2% for 1940, and with 82.9% for the corresponding week for 1939.

Paper board production for the week ended August 7 was 94.0%, compared with 75.0% for 1942, with 91.0% for 1941, with 74.0% for 1940, and with 71.0% for the corresponding week for 1939.

Wood Pulp

The wood pulp market is firm. The OPA has made some price adjustments in unbleached Mitscherlich pulp, the quotations of which now range from $72 to $82 per ton, less freight, not exceeding OPA allowances. The basic price is $72 per ton for most mills. Certain mills, however, are now permitted to charge $67.50 per ton, f. o. b. point of shipment, plus freight. The freight rates range from $5 to $15 per air-dry ton.

Reports indicate that the total U. S. wood pulp production for the first half of 1943 was 4,555,300 tons, compared with 5,521,600 tons for the corresponding period in 1942, or a decrease of 17.5%.

Rags

Current reports indicate that mill buying is good in new whites and in the colored grades of new rags. Buying is also in rather heavy volume at this date on the roofing grades of old cotton rags. Ceiling prices prevail, excepting on new white shirt cuttings which are a little under the ceiling price.

Old Rope and Bagging

No important change in the market situation has been reported in old rope at this date. Mill buying continues good.

The restriction recently issued by the WPB on the sale and consumption of old scrap bagging may be modified soon, current reports indicate. Prices on all grades of scrap bagging are nominal.

Old Waste Paper

Mill buying of old waste paper is reported active, some reports stating, heavy, at this date. All grades are in demand and ceiling prices are widely reported as being paid by mills.

Twine

No important change has been reported in the twine market this week. Demand for defense continues heavy and civilian demand is active for such grades as are permitted for civilian consumption.

To Hire Former Japanese Loggers

VANCOUVER, B. C., August 7, 1943—Representatives from logging camps in British Columbia's north country are now interviewing former Japanese loggers, located in road camps between Jasper and Blue River, with a view to hiring them, George C. Collins, general superintendent of British Columbia Security Commission, announces.

Following a meeting of logging operators in Prince George arrangements were made to hire whatever Japanese are needed, with the stipulation that representatives of the logging firms tour the camps and personally select the men they wish to hire.

Once the men have been chosen, an individual permit must be granted by the Security Commission before any Japanese can leave the camp. "No applications have yet been received by us," said Mr. Collins.

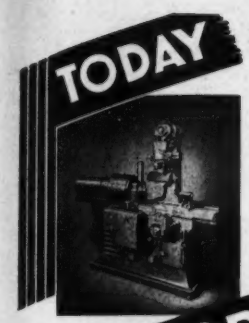
The logging representatives, looking for 350 Japanese loggers, will tour the camps only as far as Blue River, "for the the time being," said the Security Commission chief. Officials of Selective Service are assisting in loggers' quest for Japanese labor.

Handbook of Plastics

D. Van Nostrand Company has recently published a very useful and interesting 1032 page volume entitled the Handbook of Plastics by Herbert R. Simonds, the late Carleton Ellis and M. H. Bigelow. Among the subjects covered are the following: Survey of the Industry, Physical Properties of Plastics, Plastic materials, Manufacture, Processing and Fabrication, Chemistry of Plastics, Application, Commercial Considerations and Bibliography and Indices.

The information is organized for ready reference for every type of plastic. Direct reference to trademarked products is given. Particularly valuable is the section on application of plastics, which gives practical information for designing plastic parts, and for choosing plastics for any requirements.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd street, New York, N. Y. for ten dollars per copy.



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But, when the war is over, we will be better equipped than ever before to meet your requirements for paper converting machinery and parts. The above are two machines of our varied line that will then be available to you.

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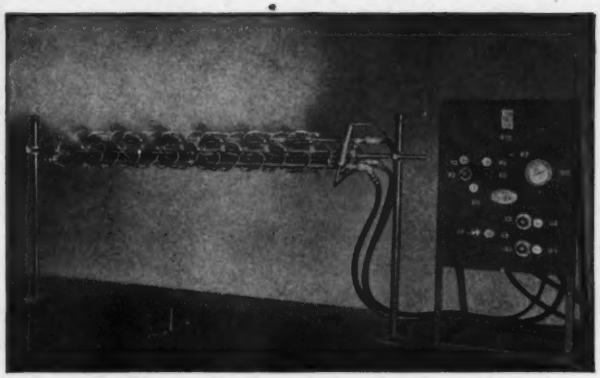

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Used extensively for the elimination of production difficulties due to uncontrolled moisture content. Improves finish, increases fibre strength and flexibility, eliminates static, prevents warp and waste. Each installation designed to meet operating requirements for any specified width, weight and speed of paper.

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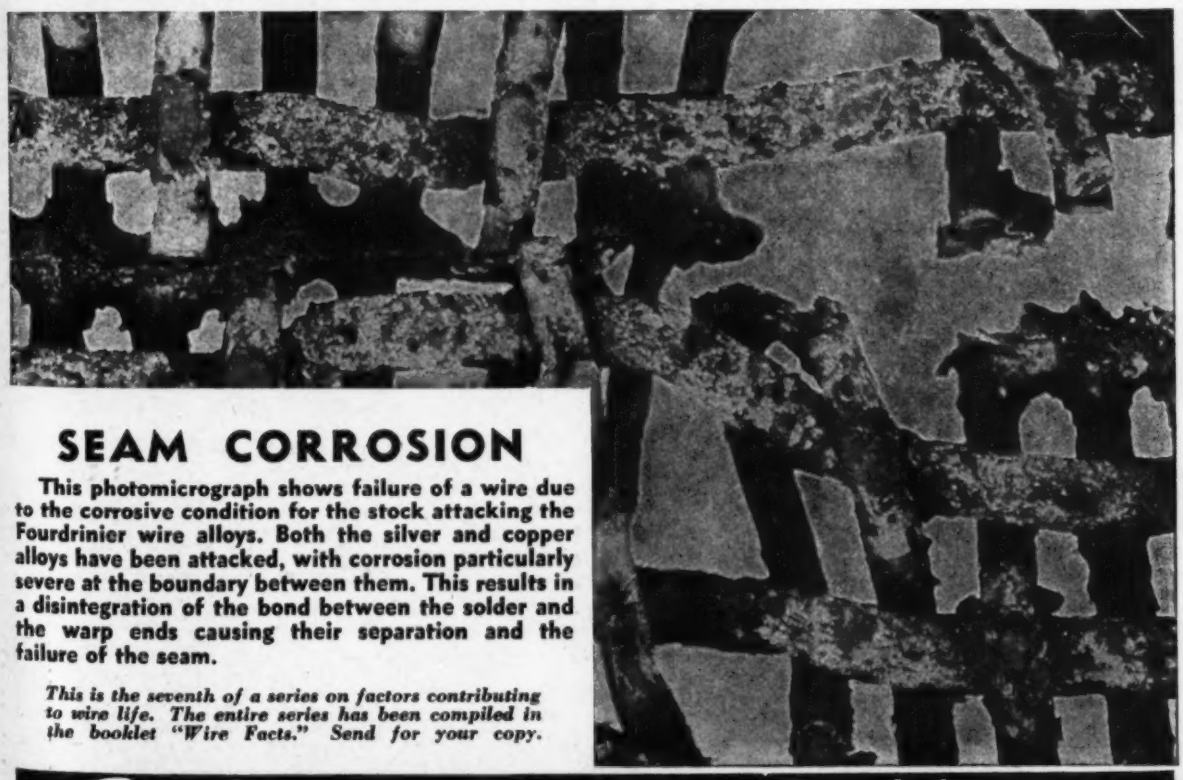


SEAM CORROSION

This photomicrograph shows failure of a wire due to the corrosive condition for the stock attacking the Fourdrinier wire alloys. Both the silver and copper alloys have been attacked, with corrosion particularly severe at the boundary between them. This results in a disintegration of the bond between the solder and the warp ends causing their separation and the failure of the seam.

This is the seventh of a series on factors contributing to wire life. The entire series has been compiled in the booklet "Wire Facts." Send for your copy.

Appleton Wire Works, Inc. Appleton, Wis.

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL.
Wednesday, August 18, 1943

BLANC FIXE—Quotations on blanc fixe are firm and continue unchanged at prevailing market levels. The pulp is currently quoted at $40 per ton in barrels, at works; the powder is offered at $60 per ton, f.o.b., works. Demand reported fair for the week.

BLEACHING POWDER—Prices on bleaching powder are firm. Current demand reported active. Bleaching powder is currenly quoted at $2.50 per 100 pounds, in drums, at works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 10,000 pounds or more, 24 cents per pound; 2,000 pounds, 24¼ cents per pound; less than 2,000 pounds, 24¾ cents per pound, f.o.b., shipping point.

CAUSTIC SODA—Prices on caustic soda are reported unchanged. Supply for the current week is reported tight. Solid caustic soda is currently quoted at $2.30 per 100 pounds; flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Quotations on china clay are firm and continue unchanged. Demand reported fair for the current week. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton at mine. Imported clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Quotations on chlorine unchanged. Government demand for war use continues heavy. Prices firm. Supply easy. Chlorine is currently quoted at from $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—Quotations on some grades of rosin are higher for the current week. "G" gum rosin is currently quoted at $4.10 per 100 pounds in barrels, Savannah. "FF" wood rosin is currently quoted at $3.89 per 100 pounds in barrels, New York. Seventy per cent gum rosin size is currently quoted at $4.29 per 100 pounds, f.o.b., works.

SALT CAKE—Prices on salt cake are firm. Demand reported light for the current week. Domestic salt cake is currently quoted at $15 per ton in bulk; chrome salt cake at $16 per ton. All prices in car lots, f.o.b., shipping point.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market quotations. Demand heavy. Quotations on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Prices on corn starch are unchanged for the current week. Supply situation tight. Pearl is currently quoted at $3.10 per 100 pounds; powdered starch at $3.20 per 100 pounds. All prices in bags, car lots, f.o.b, Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Supply more limited for the current week. The commercial grades are currently quoted at $1.15 per 100 pounds; iron free at from $1.75 to $1.85 per 100 pounds, in bags, car lots, f.o.b., works.

SULPHUR—Prices of sulphur are firm and continue to conform to prevailing market quotations. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $18 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $16 to $21 per ton, at mills. No quotations on imported talc.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

News, per ton—			
Roll, contract	*$54.00	@	—
Sheets	62.00	"	—
* OPA Maximum Price.			
Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill			
Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag	*4.375	"	—
* OPA Manufacturers' Prices.			
Tissues—Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½	1.00	"	—
White No. 2	.90	"	—
Anti-Tarnish M.F.	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Toilet—1 M. Sheets—Per Case			
Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.60	"	—
Bleached, Jr.	3.20	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.	5.75	"	6.00
Boards, per ton—			
News	*48.00	@	—
Chip	*45.00	"	—
Sgl. Mla. Ll. Chip	*60.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext.		
No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	32.20 " 37.75	33.35 " 39.25
85% Rag	.... "	29.90 " 35.00
75% Rag	23.00 " 27.00	24.15 " 28.25
65% Rag	.... "	22.80 " 27.75
50% Rag	18.70 " 22.75	19.90 " 24.25
25% Rag	16.40 " 20.00	17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$10.55@$12.75	$11.70@$14.25
No. 2	9.65 " 11.75	10.80 " 13.25
No. 3	9.20 " 11.25	10.35 " 12.50
No. 4	8.90 " 10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated	$13.65	@	$15.50
No. 2 Glossy Coated	12.40	"	14.00
No. 3 Glossy Coated	11.60	"	13.25
No. 4 Glossy Coated	11.15	"	12.75
No. 1 Antique (watermarked)	10.25	"	11.75
No. 2 Offset	9.60	"	11.00
A Grade E. F.	9.35	"	10.75
A Grade S. & S. C.	9.60	"	11.00
B Grade E. F.	8.85	"	10.25
B Grade S. & S. C.	9.10	"	10.50
C Grade E. F.	8.55	"	9.75
C Grade S. & S. C.	8.80	"	10.00
D Grade E. F.	8.25	"	9.50
D Grade S. & S. C.	8.50	"	9.75

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight, Not Exceeding OPA Allowances.

Bl. Softwood Sulphite	$76.00
Unbl. Softwood Sulphite	65.00@ 66.00
Bl. Hardwood Sulphite	73.50
Unbl. Hardwood Sulphite	63.50
Bl. Mitscherlich	81.00
Unbl. Mitscherlich	72.00 @ 82.00
N. Bleached Sulphate	86.00
S. Bleached Sulphate	79.00
N. Semi-Bleached Sulphate	82.00
S. Semi-Bleached Sulphate	75.00
N. Unbl. Sulphate	73.00
S. Unbl. Sulphate	63.50
Bl. Soda	66.00
Unbl. Soda	62.00
Groundwood	46.00

Transportation Allowances Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	$11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.25*
Silesias No. 1	—	"	5.75*
New Unbleached	6.75	"	7.50*
Blue Overall	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	3.50*

* OPA Maximum Prices.

West Virginia Pulp and Paper Company

230 Park Ave.
New York

35 East Wacker Drive
Chicago

Public Ledger Building
Philadelphia, Pa.

503 Market St.
San Francisco, Cal.

Manufacturers of

ENGLISH FINISH SUPERCALENDERED MACHINE FINISHED BOOK and LITHOGRAPHIC PAPERS

Offset, Envelope, Bond, Writing, Mimeograph, Ledger, Eggshell, Cover and Music Papers, Index Bristol, Post Card and Label Papers

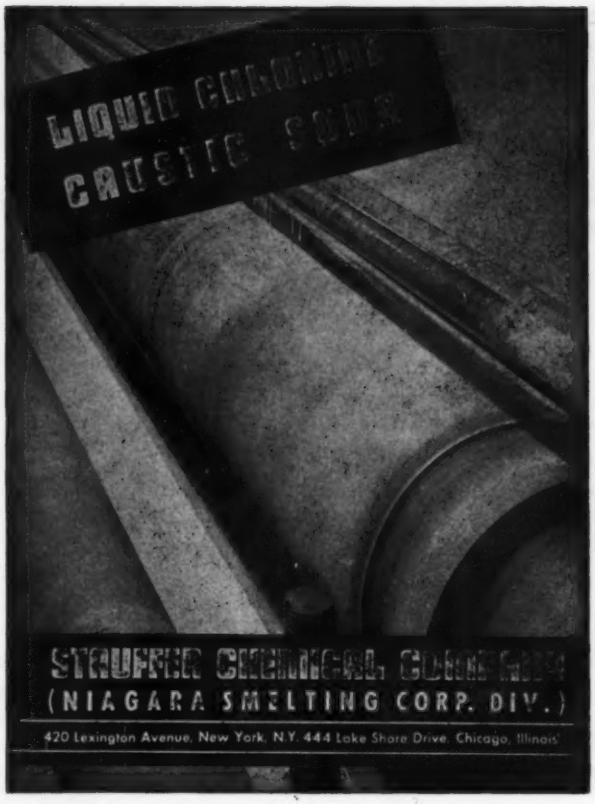
HIGH GRADE COATED BOOK

• • • •

KRAFT WRAPPING AND KRAFT ENVELOPE
KRAFT LINER BOARD
BLEACHED SULPHITE AND SODA PULP
BLEACHED AND UNBLEACHED KRAFT PULP

MILLS:

Mechanicville, New York
Lake, Maryland
Covington, Virginia
Tyrone, Pennsylvania
Williamsburg, Pennsylvania
Charleston, South Carolina

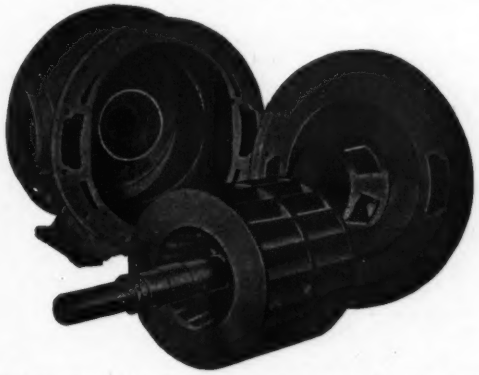

LIQUID CAUSTIC
CAUSTIC SODA
STAUFFER CHEMICAL COMPANY
(NIAGARA SMELTING CORP. DIV.)
420 Lexington Avenue, New York, N.Y. 444 Lake Shore Drive, Chicago, Illinois

PRICE & PIERCE »»»»»»»ltd•

Wood Pulp & Paper Agents

60 East 42 Street New York, N. Y.

SIMPLICITY



NASH VACUUM PUMPS HAVE ONE MOVING PART

Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

Old Rags

White, No. 1—			
Repacked	*1.80	"	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

OPA Maximum Prices.

Foreign Rags

All Prices nominal

New Rags

New Dark Cuttings	2.25	●	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	4.25	●	4.35
Wool Tares, light	4.25	"	4.50
Wool Tares heavy	4.50	"	5.00
Bright Bagging	4.50	"	4.85
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	5.50	"	—
No. 1 Sisal Strings	*4.00	"	—
Mixed Strings	2.00	"	—

* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	●	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.57½	"	—
Mixed Books	.85	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	.85	"	—

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	●	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17¼	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila	-	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White No. 1	.07¼	●	.07½
New White No. 2	.04½	"	.05
Light Silesias	.04½	"	.04¾
Silesias, No. 1	.04	"	.04¼
Black Silesias, soft	.03¾	"	.04
New Unbleached	.07¼	"	.07½
Washable Prints	.03¼	"	.03½
Washable No. 1	.02	"	.02¼
Blue Overall	.04½	"	.05½
Cottons—According to grades—			
Washable shredding	—	"	.01¼
Fancy Percales	.03¼	"	.03½
New Black Soft	.02¾	"	.03
New Dark Seconds	1.75	"	2.00
Khaki Cuttings—			
No. 1 O. D.	.03	"	.03¼
No. 2 Mixed	.02¼	"	.02½
Corduroy	.01¾	"	.02¼
New Canvas	.04¾	"	.05¼
New Black Mixed	—	"	.02½

Domestic Rags (Old)

White No. 1—Repacked	3.80	"	—
White No. 2—Repacked	2.90	"	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings— (Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	"	3.50
Sisal Rope	3.75	"	—
Mixed	1.00	"	1.50
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares, heavy	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila)

OPA Maximum Prices

No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.57½	"	—
Mixed Books	.85	"	—
No. 1 White Ledger	2.17½	"	—
No. 2 Mixed Ledger, colored	1.87½	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.85	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	.85	"	—

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices

No. 1 Hard White Shavings, unruled	2.87½	●	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.57	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.70	"	—
Overissue News	.85	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.15	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	3.75	●	4.00
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	*4.25	"	—
Mixed Rope	1.35	"	1.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.50	"	5.00
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.60	"	3.85
Wool Tares—			
Foreign	(nominal)		
Domestic	4.25	"	—
Aust. Wool Pouches	4.65	"	4.87½
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	"	3.00
No. 2 Bagging	1.35	"	—

* OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	●	.04¾
Fancy Percales	.04¼	"	.05
New White No 1	.06¾	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06¾
Underwear Cutters, Bleached	.06¾	"	.06¾
Underwear Cutters, Unbleached	.05¾	"	.06
Silesias No. 1	.06	"	.06¾
New Black Silesias	.03	"	.03¾
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05½	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03½	"	.03¾
Corduroy	.03¾	"	.03¾
New Canvas	.06¼	"	.06¾
B. V. D. Cuttings	.06¼	"	.06¾

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	●	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—
No. 2	1.45	"	—
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	"	—
Quality C	.95	"	—
Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

(F. o. b Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices.

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.17½	"	—
No. 1 Heavy Books & Magazines	1.67½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	.85	"	—
No. 1 News	.75	"	—
No. 1 Mixed Paper	.70	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—